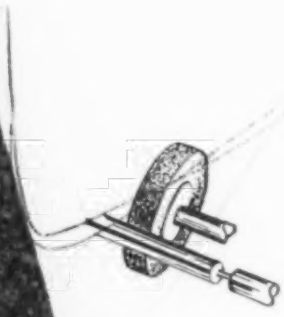
Grinding and Finishing

WHEELS • GRINDING • HONING • LAPPING MACHINES • ACCESSORIES • PORTABLE GRINDERS • TUMBLING • ABRASIVES

chcock publication

The Magazine Devoted Exclusively to Abrasive Operations



★ FEATURES

SPECIAL REPORT—

German Production Methods Today—Page 18

Grinding and Finishing in Chrysler's TorqueFlite Transmission Plant—Page 25

Developing Standard Time Data for Grinding, Part 4—Page 36

Multiple Clamping with a Roller Chain—Page 46

Business Decisions That Affect Your Tax Return—Page 48

ALSO IN THIS ISSUE

Safety

Letters to the Editor

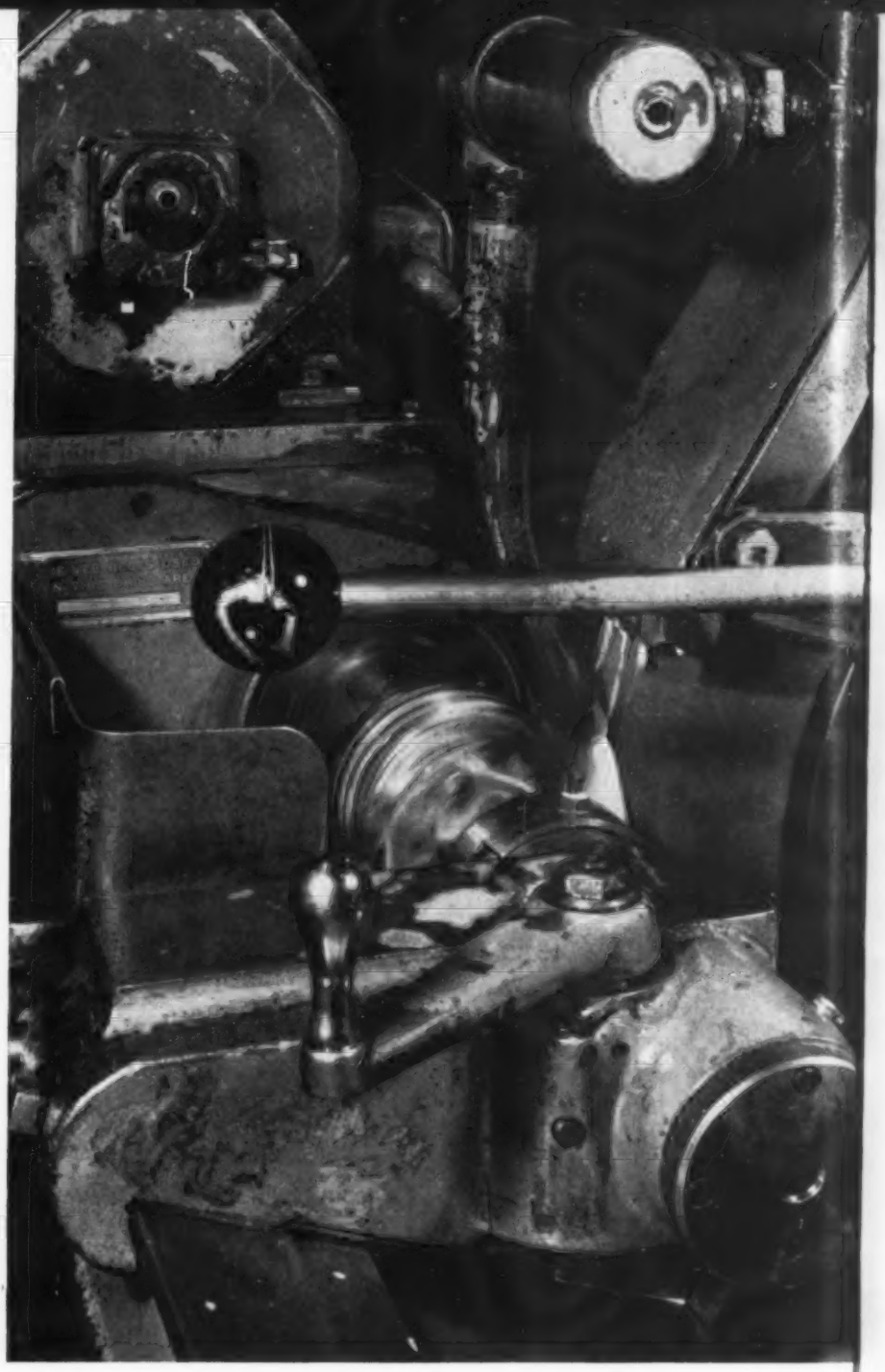
Free Literature

What's New in Equipment and Materials

News of the Industry

JANUARY, 1957

"...good rust protection and a fine finish"



Here's a plant *(name on request) that has been using* ***Texaco*** *cutting fluids for years. To be sure they were getting top results, they tested them against competitive products and said—*

"We found out fast that Texaco does an excellent job. For example: on our grinding operations, where precision is essential and low micro finishes necessary, we found that Texaco Soluble Oil HW (especially designed for hard water) gave us good rust protection and a fine finish at lean emulsion ratios. In addition, it did not load wheels and we had no odor complaints."

Emulsions of *Texaco Soluble Oil* are ideal for surface and centerless grinding. For thread and form grinding, *Texaco Grindtex Oils* are recommended. These are clear, transparent oils that assure longer wheel life, fewer dressings.

There is a complete line of *Texaco Cutting, Grinding and Soluble Oils* to help you do all your machining better, faster and at lower cost. Let a Texaco Lubrication Engineer help you select the proper ones. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO

CUTTING, GRINDING, SOLUBLE AND HYDRAULIC OILS

JANUARY, 1957—VOL. 2, NO. 9

Grinding and Finishing

Contents

Editor's Page 17

FEATURED ARTICLES

German Production Methods Today 18
by William F. Schleicher

Grinding and Finishing in Chrysler's TorqueFlite Transmission Plant 25
by Jack Kenyon

Developing Standard Time Data for Grinding Operations—Part 4 .. 36
by E. A. Cyrol

Grinding Safely 44
by Edmund Mottershead

Multiple Clamping with a Roller Chain 46
by Clifford T. Bower

Business Decisions That Affect Your Tax Return 48

DEPARTMENTS

Letters to the Editor 4
Shop Hints 54
Free Catalogs and Bulletins 58
What's New in Equipment and Materials 63
News of the Industry 80
District Managers 84
Index to Advertisers 86

EDITORIAL STAFF

William F. Schleicher, vice president and editorial director; *Jack Kenyon,* managing editor; *Richard C. Bush,* associate editor; *Ronnie Burritt,* consulting technical editor.

BUSINESS STAFF

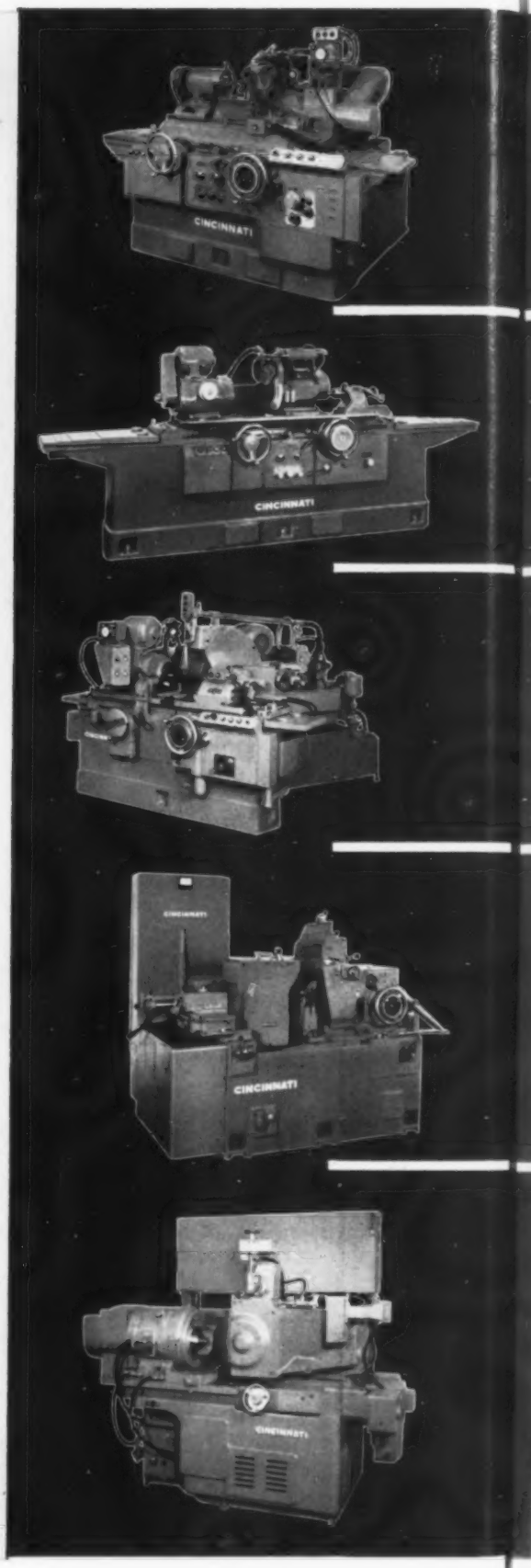
R. C. Van Kampen, president; *Vincent C. Hogren,* executive vice president; *J. E. Hitchcock,* vice president; *Oliver S. Pepper,* business manager; *John S. Todd,* production manager; *L. M. Schroeder,* art director; *Robert L. Spreckels,* circulation manager.

Subscription rates: $6.00 per year in U.S.A. $7.50 per year elsewhere.

Copyright by Hitchcock Publishing Co., 1957, 222 East Willow Ave., Wheaton, Ill. Phone WHeaton 8-3400. Cable Address: HITCHPUB.

Accepted as controlled circulation publication at Pontiac, Illinois

PRECISION PLANNING GUIDE for '57



Want to take some of the work out of your methods and equipment planning for the coming months? Let Cincinnati Engineering Service apply the newest and most advanced methods to your production grinding requirements. Cincinnati's complete line of precision centertype and centerless grinding machines gives you a choice of equipment to fit your individual needs. Five typical CINCINNATI® FILMATIC Grinding Machines are illustrated here. Of course, there are many more. In all, over 150 sizes of Plain, Universal and Roll Grinding Machines; six Centerless Grinders from 5 to 75 hp; Chucking and Micro-Centric Grinders; Surface Grinder; and special grinding machines. For brief specifications, look in the latest issue of Sweet's Machine Tool File. Or, if you don't have a copy, write for our new general catalog, just off the press, No. M-1961.

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO

CINCINNATI

CINCINNATI

GRINDING and FINISHING

lain centertype grinding; manual or automatic infeed grinding; automatic electric gage sizing, if desired; readily automated.

CINCINNATI FILMATIC Plain Hydraulic Grinding Machines of the type illustrated here will be your first choice for the work outlined at the left. There are four sizes: 6″R, 10″L, 10″R and 14″L. They incorporate a number of exclusive cost-reducing features, including FILMATIC grinding wheel spindle bearings and automatic grinding wheel balancing. The following types of production equipment are available: Push-button Automatic Infeed Attachment; Automatic Gap Eliminator; Behind-the-wheel Profile Truing; Automatic Air-Electric Gage Sizing with Cycle Time Stabilizer (as illustrated). Get the complete story in the following catalogs . . . 6″R and 10″L machines, G-660-1; 10″R and 14″L machines, G-661-1.

toolroom centertype grinding, both external and internal; production and toolroom grinding combined.

CINCINNATI FILMATIC 12″, 14″ and 18″ Hydraulic Universal Grinders are the standard of industry for medium- to large-size toolroom grinding. They are equipped with an internal grinding unit hinged at the front of the wheelhead housing; FILMATIC grinding wheel spindle bearings last a lifetime and require no adjustment; the footstock spindle is chromium plated to prevent wear; headstock speeds are selected with an easy-to-turn dial; rapid cross traverse feature available. A smaller machine, the *10″ Universal,* may be equipped for production infeed and shoulder grinding. Catalog No. G-663 for the 12″, 14″ and 18″ machines; catalog No. G-577-5 for the 10″ machine.

automatic diameter and shoulder grinding in unison; automatic electric gage sizing, manual or automatic flagging devices, if desired.

CINCINNATI FILMATIC Semi-Automatic Angular Wheel Slide Grinding Machines are tops for precision cylindrical work requiring accurately ground diameters and adjacent shoulders. Both are completed in one automatic infeed cycle. These machines, built in 6″R, 10″L, 10″R and 14″L swing sizes, are equipped with Automatic Grinding Wheel Balancing, FILMATIC grinding wheel spindle bearings and other cost-reducing features. They have plenty of capacity for multiple diameter work. Get your copy of catalog No. G-647-1.

centerless grinding, infeed and thrufeed; variety or high production; short work and bar work; manual or automatic cycle grinding; readily automated.

CINCINNATI FILMATIC Centerless Grinding Machines are without question the finest equipment available for any type of work which can be centerless ground. Additional industries are constantly finding the CINCINNATI Centerless their most profitable precision grinding equipment. And you have the advantage of Cincinnati's 30 years' experience in centerless grinding applications. There are six in the Cincinnati line: No. 0, 2 (illustrated), 3, 4, 5 and 6; 5 to 75 hp. Many attachments available, including hopper feeds, spindle reciprocating, long bar equipment and others. All are included in Sweet's; individual catalogs available.

automatic grinding of short parts which can be held in a chuck; readily automated.

CINCINNATI FILMATIC Chucking Grinders. Of course you'll want Cincinnati for your precision chucking work, for only Cincinnati can give you so many advantages. FILMATIC grinding wheel spindle bearings, an exclusive feature, require no adjustment. Choice of single spindle or two-spindle headstock. Machine mounted cabinet for complete and accessible electrical controls. Made in two sizes: No. 1, capacity 0 to 4″ diameter; No. 2, capacity 2″ to 10″ diameter. Ask for the new CINCINNATI FILMATIC Chucking Grinder catalog No. G-685.

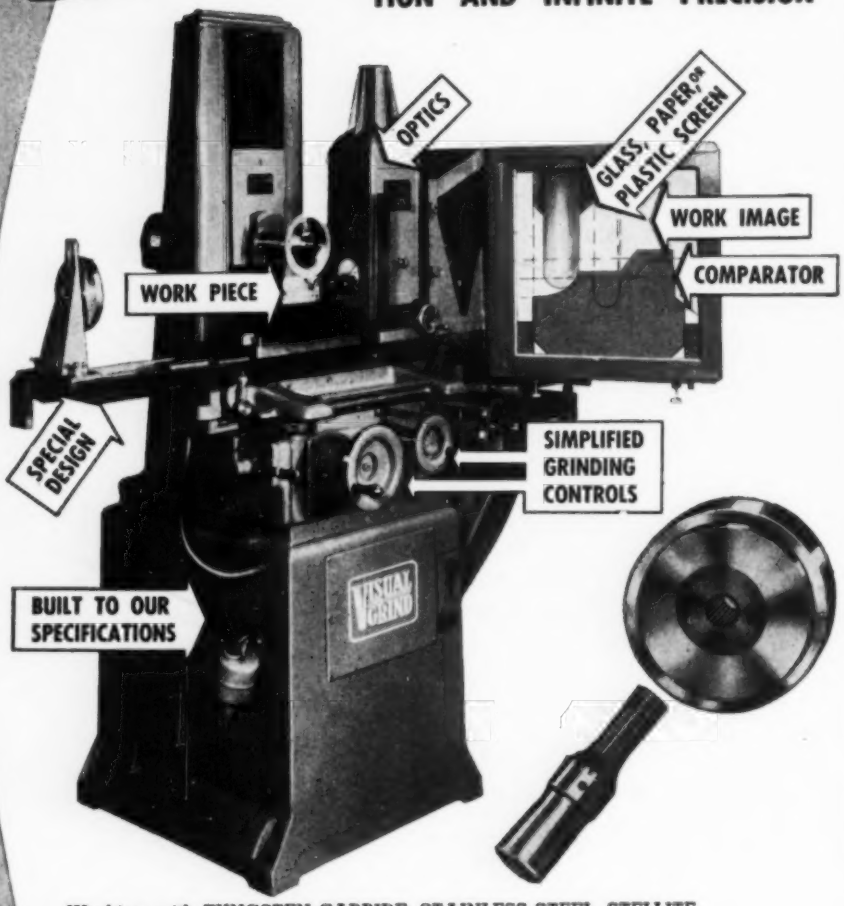
FILMATIC

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES • ROLL GRINDING MACHINES • SURFACE GRINDING MACHINES • CHUCKING GRINDERS • MICRO-CENTRIC GRINDING MACHINES • CENTERLESS LAPPING MACHINES

Use postpaid card. Circle No. 201

VISUAL GRIND

TOP FIRMS SHOW
PROVED SAVINGS UP TO 75%
IN SET-UP AND GRINDING TIME WITH CONTINUOUS WORK INSPECTION AND INFINITE PRECISION



Working with TUNGSTEN CARBIDE, STAINLESS STEEL, STELLITE or TOOL STEELS—VISUAL GRIND will permit a semi-skilled operator to grind precision pieces without continued checking with the tool room—since this function is done by the built-in optical comparator. Fill in the coupon below—let us show you how VISUAL GRIND will speed production—cut costs.

Fill in this coupon NOW

VISUAL GRIND

THE CLEVELAND GRINDING MACH. CO.
1643 Eddy Road Cleveland 12, Ohio

Gentlemen:

☐ Please have your representative call at our plant. The most convenient time would be (week) .....

☐ Phone for appointment.

☐ Please send us complete information on the NEW VISUAL GRIND.

NAME..... TITLE.....

COMPANY .....

ADDRESS .....

Use postpaid card. Circle No. 202

Letters to the Editor

I wish to take this opportunity to congratulate you and your staff on the excellent job that you people are doing. We in Alliance have found Grinding and Finishing a high quality publication concentrating on our industry.

On behalf of our management, I wish to extend an invitation to you and your staff to visit our Coated Abrasives Plant and see for yourself how sand-paper is manufactured.

S. E. Scholes
Armour and Company
Alliance, Ohio

Thanks for the kind invitation.

Surface Finishing Series

The recent article in your informative magazine "Significance and Measurement of Surface Finishing" by R. E. Reason has shed much light on an important but little understood phase of modern manufacture. You and he are to be thanked and congratulated for permitting your readers the privilege of being so well informed.

If possible I would like to obtain reprints of the entire series; please consider my request if and when reprints become available.

Thanking you once again for your fine magazine, I remain

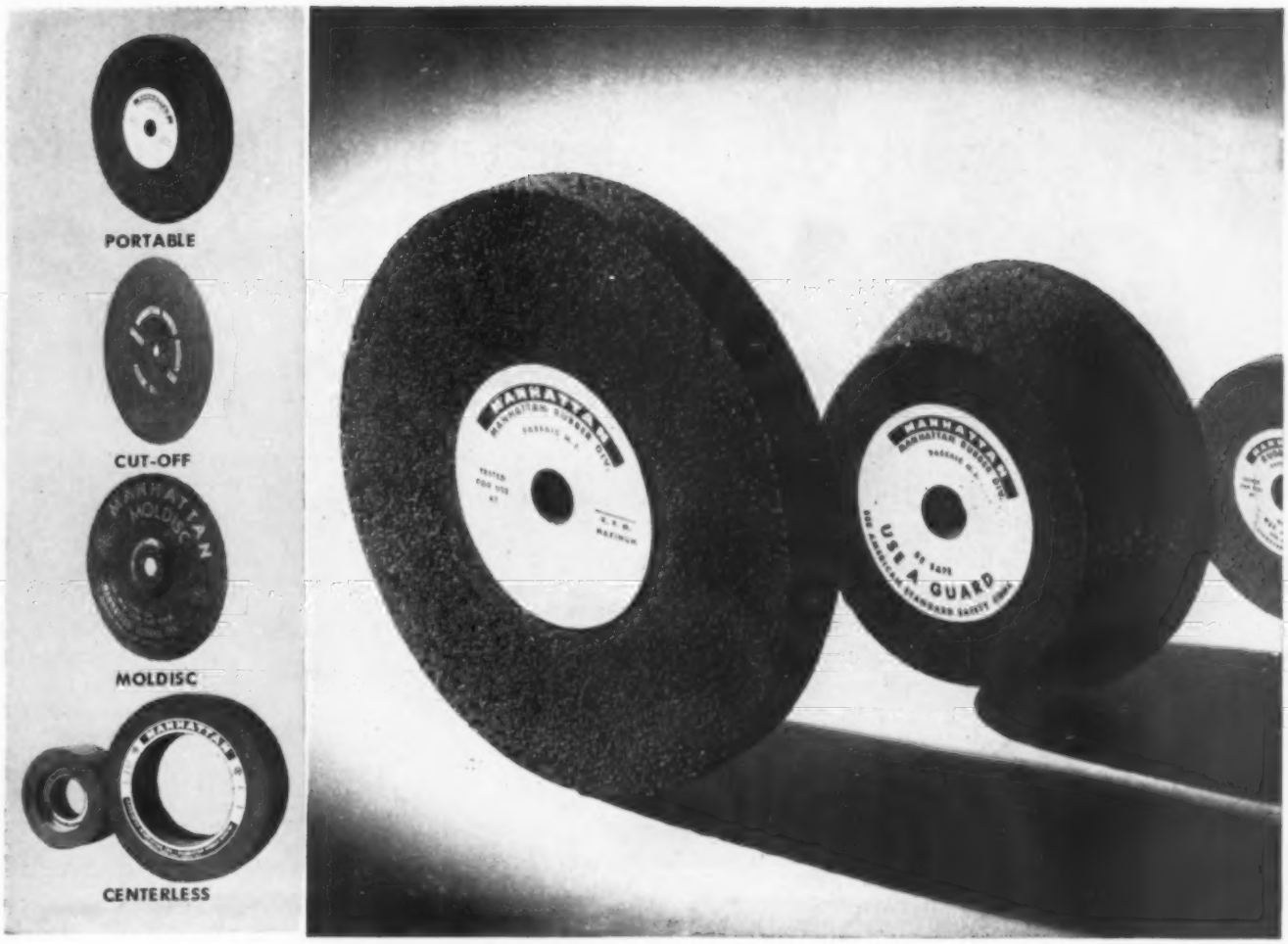
James Anderson, Dept. of Mach. Shops
Queens Vocational High School, L. I., N. Y.

In the September, October, and November series of your good magazine there appeared a most interesting series of articles by Mr. R. E. Reason entitled, "Significance and Measurement of Surface Finish."

We are very desirous of having a half dozen reprints of these articles and would greatly appreciate your letting us know first, if such reprints are available, and second, the cost of such reprints.

Allison Division, General Motors Corporation
W. L. Jacoby, Supt. Gage Control
Indianapolis, Ind.

Reprints for the Surface Finishing series are now on order at our printers and we are waiting for a supply of them. There will probably be a small charge to defray printing costs.



"More Use per Dollar" With MANHATTAN PORTABLE WHEELS

Flared cup, depressed center, cone, plug and mounted point, or straight—there's a Manhattan Portable Wheel to remove *more* metal, *faster*, at *lower* cost on your job. That's because every specification of the wheels you use—type of abrasive, grain size, hardness, structure, and bond—is determined only after careful analysis of your grinding problems . . . the amount of metal you want to remove, the finish you require. This individual engineering for each customer's job requirements accounts for the success of Manhattan Portable Wheels. Workers prefer them because they get more pieces done. Management prefers them because they assure faster, more uniform quality production . . . and they last longer. Fast cutting action *plus* long wheel life add up to more output per man hour and lower production costs—"More Use per Dollar."

Let a Manhattan abrasive wheel engineer show you how you can boost production and cut costs on *every* job with Manhattan Portable Wheels and other types of high speed, heavy duty abrasive wheels.

RM 748

GRINDING WHEEL INSTITUTE MEMBER

WRITE TO THE ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Belts • Hose • Roll Covering • Tank Linings • Industrial Rubber Specialties • Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Use postpaid card. Circle No. 203

$7200 per month saving by large automotive plant after switching to

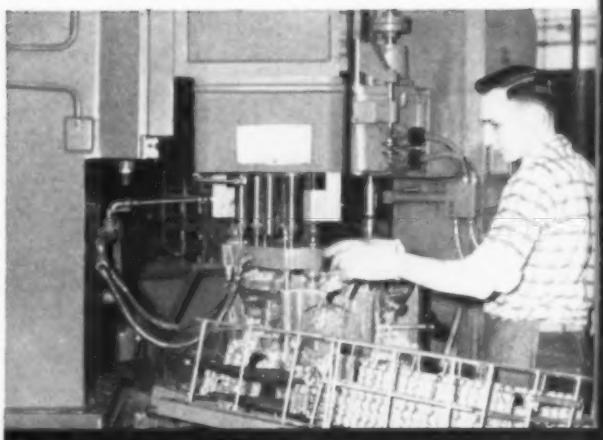
DASCO D-20

HEAVY-DUTY SOLUBLE OIL

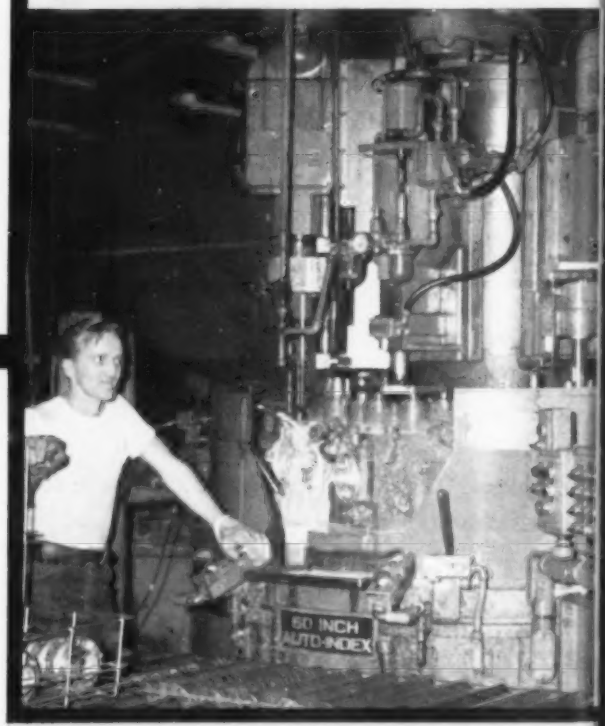
An actual saving of $7200 per month, including labor costs, has been reported by a large automotive transmission plant since switching to Stuart's Dasco D-20—*the first truly heavy-duty soluble oil* formulated and priced for general application!

ONE OIL FOR 365 DIFFERENT MACHINES—This carefully engineered compound eliminates cutting oil confusion—drastically reduces the number of cutting fluids needed in your plant. This plant uses economical Dasco D-20 in standard mixtures on *365 different machine tools*—reducing cutting oil inventory . . . saving service time and cutting oil costs . . . minimizing chance of error—yet taking advantage of all lubricating and cooling properties you expect from a heavy-duty soluble oil.

RANCIDITY ELIMINATED—This user reports that Stuart's Dasco D-20 stays sweet longer—even after long shutdowns. Rancidity is actively resisted by a special germicide additive, the best of a very few germicides that remain effective in the presence of soaps. Stuart's Dasco D-20 has superior wetting ability—remains effective when mixed with water.



Chips settle faster with Stuart's Dasco D-20, so you have a clean compound in your machine at all times. You get a better finish . . . cooler cutting and grinding.



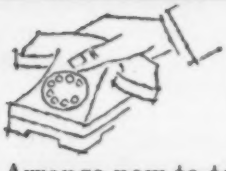
You can use low-priced Stuart's Dasco D-20 for reaming, boring, drilling, facing, chamfering, milling, tapping, threading, broaching, surface-grinding, and high-speed carbide tool machining.

For Cutting and Grinding

Stuart's Dasco D-20 maintains or improves efficiency of your cutting and grinding operations. A real heavy-duty emulsifiable oil, it forms a tough, thin film between the cutting tool and the work . . . reducing friction and preventing excessive heating. A wide variety of tough metal-cutting operations, including certain types of broaching, can be done with this *one* low-priced compound. A lean mixture for grinding enables you to take full advantage of improved wheel bonds. Properly applied, it allows you to use high-unit pressure for maximum stock removal . . . keeps wheels open and free-cutting . . . prevents heat checking.

First low-priced heavy-duty soluble oil with both additives: active germicide and E. P. base

Stuart's Dasco D-20 is the first low-priced soluble oil to offer you both a special anti-rancidity germicide and an extreme pressure base oil additive with high anti-weld and lubricity characteristics. Carefully balanced, high-quality emulsifying agents provide high-grade cooling properties . . . unusual stability for longer life. This multi-purpose, heavy-duty soluble oil gives you ideal characteristics for high-speed machining with carbide cutting tools . . . upgrades finish and tool life on tool steel applications. Stuart's Dasco D-20 has superior wetting ability . . . avoids rust . . . mixes easily . . . keeps machines and parts clean . . . and is preferred by operators.



Phone your
Stuart Service Center

Arrange now to test Stuart's Dasco D-20 on your difficult cutting and grinding jobs.

DETROIT, MICH. . . . . Tyler 7-8500
CHICAGO, ILL. . . . . Bishop 7-7100
HARTFORD, CONN. . . . . Jackson 7-1144
CLEVELAND, OHIO . . . . . Prospect 1-7411
PHILADELPHIA, PA. . . . . Devonshire 8-6100
TORONTO, CANADA . . . . . Oxford 9-9397

Representatives in all principal cities

SINCE 1865

D. A. STUART OIL CO., LIMITED
2729 South Troy Street, Chicago 23, Illinois
CANADIAN D. A. STUART OIL CO., LIMITED
3575 Danforth Avenue, Toronto 13, Ontario

Stuart

METALWORKING LUBRICANTS

Use postpaid card. Circle No. 204

the BIG difference in DIAMOND WHEELS

BOND... the big reason why diamond wheels by J. K. Smit meet your requirements

EXPERIENCE... gained from many years of testing cementing mediums and fillers

QUALITY CONTROL... that insures even distribution of diamond particles throughout every wheel

ONE SOURCE... that manufactures all types of metal, vitrified and resinoid bond diamond wheels

Your copy of Catalog #54 is awaiting your request. Call us direct on any standard or special application

J. K. SMIT & SONS, INC.
HOME OFFICE AND PLANT
MURRAY HILL NEW JERSEY
DETROIT: TORONTO, CANADA

Additional plants in London, Paris, Amsterdam and Toronto, Canada

Use postpaid card. Circle No. 205

Centerless Grinding

I read your articles on Centerless Grinding and I was very much interested in it.

I would appreciate it if you can tell me where I can get information on Concentric Grinding with a mandrel as to setting up, etc., and also crush Grinding on a No. 2 Cincinnati Centerless Grinder.

Pat D'Emico
31 Jackson Place
Moonachie, N. J.

Please send me reprints of your articles "Centerless Grinding" by your Editorial Staff and "Organizing and Operating a Precision Barrel Finishing Department" by Shipley and Biebel.

Your publication is of great value in the field.

T. F. Buchanan, Methods Engineer
Micro Switch, Div. of Minneapolis-Honeywell
Freeport, Illinois

Reprints on both the Centerless Grinding and Precision Barrel Finishing series are available at 35c each.

Semi-automatic Billet Grinding

In your December '56 issue of GRINDING and FINISHING is an interesting article on pages 46 and 47 illustrating and describing semi-automatic billet grinding.

Is it possible to secure glossy photographs of the illustrations shown? If there are any expenses incurred, please send the bill to my attention.

We would also like to know who manufactures this Ty-Sa-Man grinder. Your usual prompt cooperation is appreciated.

W. A. Ferguson
The Standard Electrical Tool Company
Cincinnati, Ohio

The Ty-Sa-Man grinder is manufactured by the Ty-Sa-Man Machine Co. of Knoxville, Tenn.

G&F Story Promotes Sales!

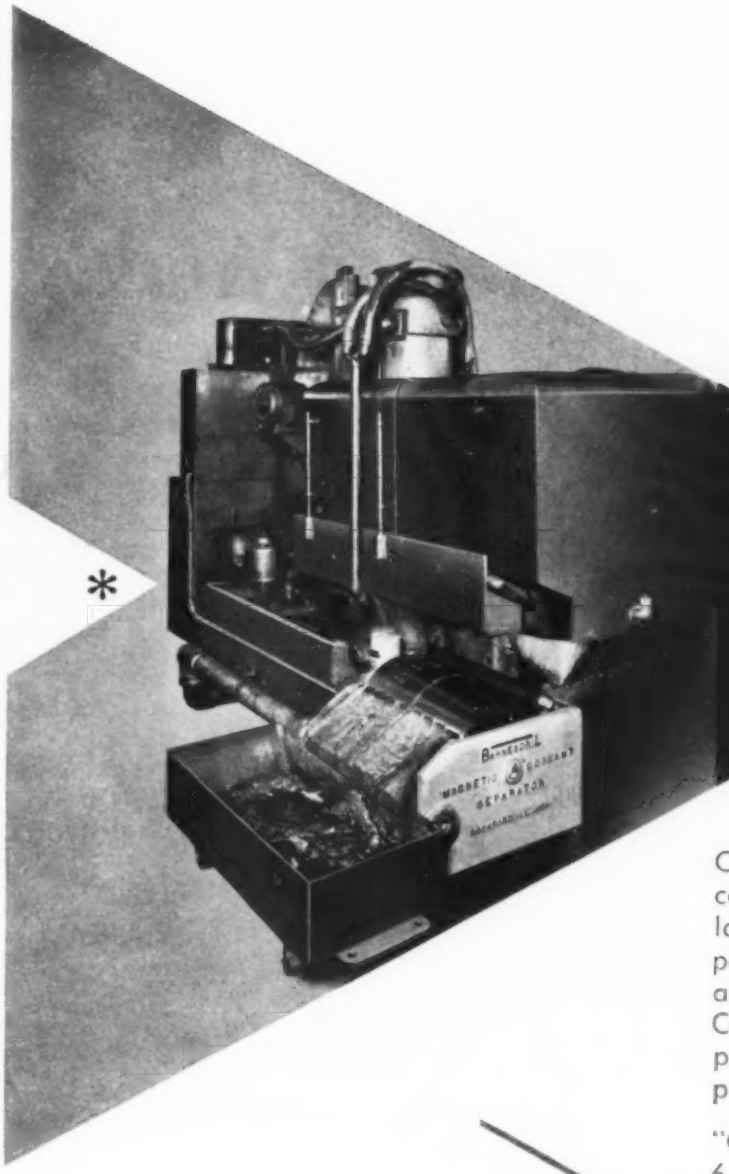
Please accept my belated thank you for the "Inchworm" story that appeared in your magazine.

I've been away from the office for the past two months and haven't had the chance to personally write you.

. . . the response from technical personnel as well as buyers of our kind of equipment has been overwhelming and we honestly feel that your magazine contributed a great deal to this response.

Harold Hechtman, Ass't to the President
Airborne Instruments Laboratory
Mineola, New York

Thanks for writing to us—your sales response must be because G&F is read by the RIGHT people!



* **CUT maintenance, labor costs**

INCREASE PRODUCTION!

Coolant fed into a BarnesdriL magnetic coolant separator continuously circulates around the drum of powerful permanent Alnico magnets. Swarf, chips, and other ferrous particles are removed. Coolant is cleaned by the separator, thus preventing machine downtime and improving finishes.

a user reports:

"Our surface grinder (above) required 6 hours of cleaning and 5 gallons of coolant per week. With the BarnesdriL magnetic separator installed, there has been no downtime in 4 months and coolant used has dropped to 1 gallon per week. *We cut our grinding costs $65.50 per week.* Paid for the installation in less than 2 months."

These savings are typical. Call your BarnesdriL Factory Representative today or write for Catalog 350.

*BarnesdriL Magnetic Separator =4 installed on a Blanchard No. 18 Surface Grinder.

50th year

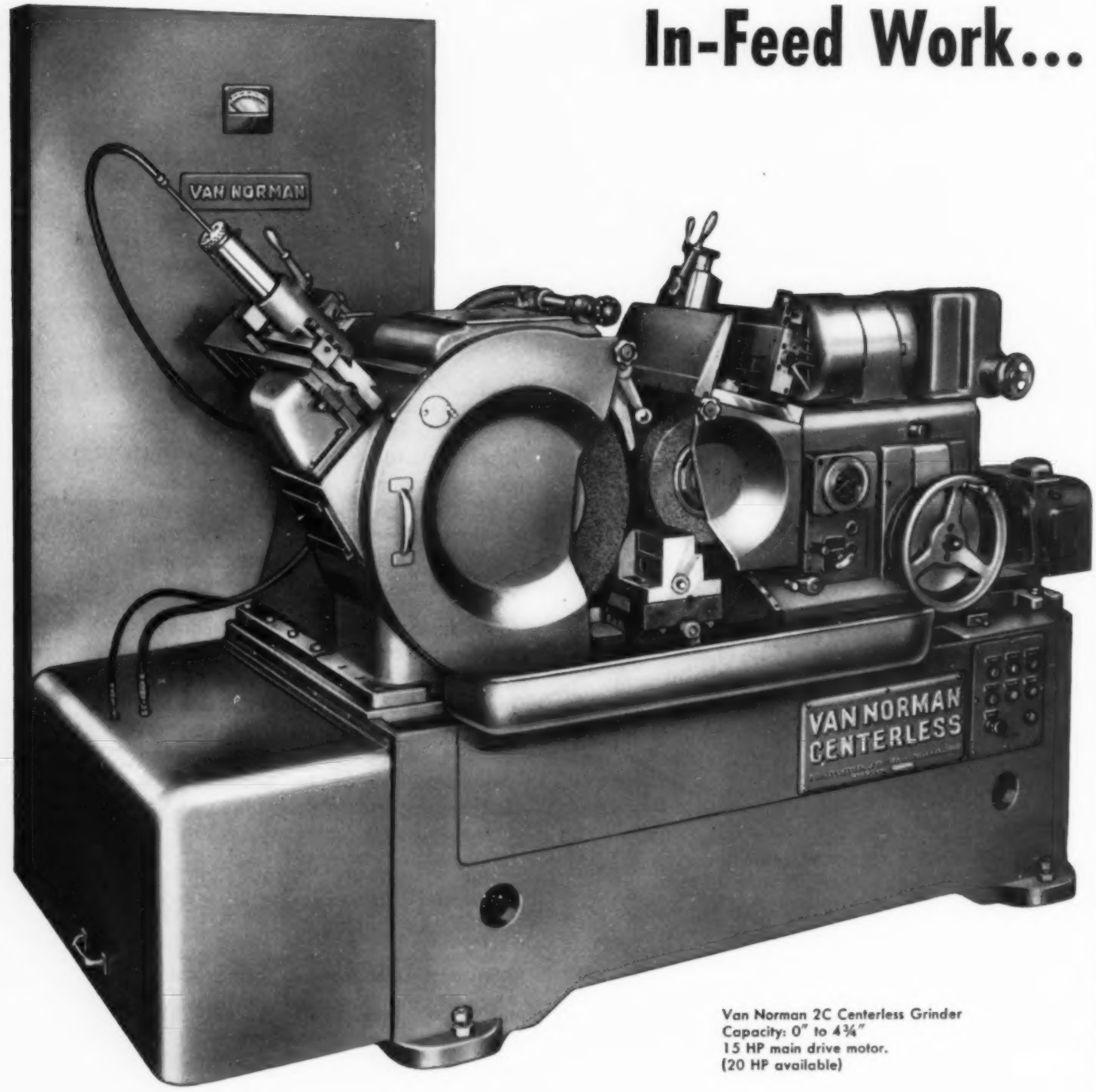
FILTRATION DIVISION

BARNES DRILL CO.

886 CHESTNUT STREET • ROCKFORD, ILLINOIS
DETROIT OFFICE: 3419 South Telegraph Road

Use postpaid card. Circle No. 206

Now you can do: Thru-Feed Work...
In-Feed Work...

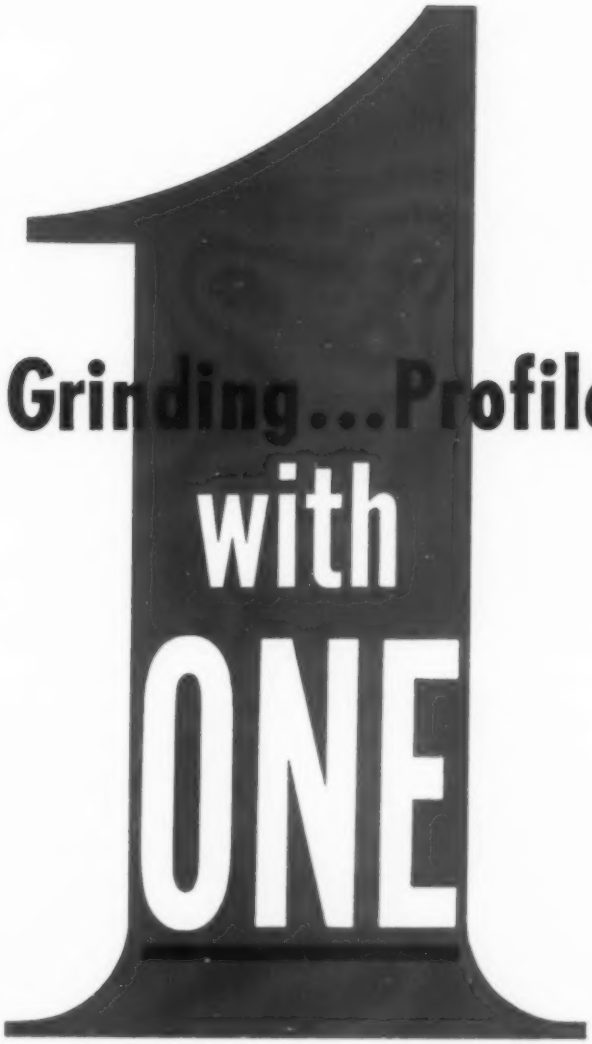


Van Norman 2C Centerless Grinder
Capacity: 0" to 4¾"
15 HP main drive motor.
(20 HP available)

VAN NORMAN MACHINE C

MANUFACTURERS OF — Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

...Form Grinding...Profile Work...



VAN NORMAN 2C
Centerless Grinder

Featuring a 15 HP main drive motor which provides ample power for every grinding job, the Van Norman 2C Centerless Grinder actually gives you the facilities of *3* centerless grinders . . . standard grinding for thru-feed work . . . standard grinding for in-feed jobs and, equipped with crush dressing attachment, form grinding and profile work.

Get complete details on this newest in the expanding line of Van Norman grinders. Write, wire or telephone today for descriptive catalogs.

Check these features of the Van Norman 2C Centerless Grinder:

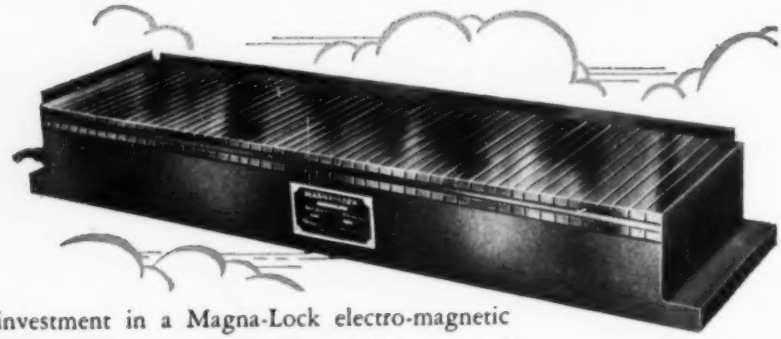
- √ Hard chrome plating of regulating wheel slide preserves original factory built-in accuracy.
- √ Grinding wheel and regulating wheel spindles are of a unit type construction . . . totally enclosed with double-row super-precision bearings, sealed and lubricated for life — assuring rigidity and accuracy previously unobtainable in centerless grinding, vibrationless operation.
- √ Spindles require no warm-up period, eliminating "creep."
- √ Infinitely variable regulating wheel drive.
- √ Combination straight and profile hydraulic wheel dressers for each wheel.
- √ Crush dressing attachment.

E COMPANY
SPRINGFIELD 7, MASSACHUSETTS

Don't wait . . . for extra profit install a Van Norman machine now! They are available in many purchase plans . . . Outright sale . . . Purchase on conditional sales contract up to five years . . . Pay as you depreciate . . . up to 10 years.

Use postpaid card. Circle No. 207

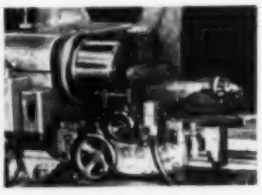
"The Sky's The Limit" when it comes to profitable uses for MAGNA-LOCK CHUCKS



Your investment in a Magna-Lock electro-magnetic chuck is an investment in *versatility* which pays real dividends many times over. In addition to normal surface grinding operations, users are constantly finding new and practical applications of the *extra holding* power of Magna-Lock Chucks for jobs such as these:

MILLING OPERATION

66% reduction in setup time for milling cast iron gibs at Turchan Follower Machine Co.



LATHE OPERATION

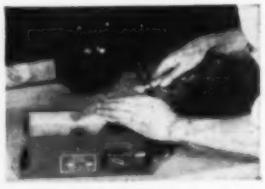
Holding 1/16" thick steel discs for grooving. Production, 300 pieces per hour. Wabash Div., Raybestos Manhattan Co.

TRANSFERRING PARTS

loading and unloading water heater shells at Permaglas Div., A. O. Smith Corp.

FLAME HARDENING

LAYOUT WORK



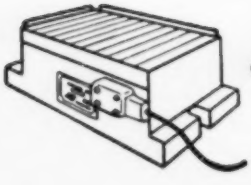
HAND FILING

Your jobs, too, can be done faster, at less cost through the 22% *extra holding power* of Magna-Lock Chucks—all steel, moisture-proof, shock-proof. Rectangular chucks from 5" x 10" to 30" x 96" working surfaces—rotary chucks from 6¼" diameter face to 72" diameter—swiveling chucks from 5" x 10" to 12" x 84".

To get the most for your money, specify Magna-Lock. To make the most of Magna-Lock versatility, consult our engineers about your idea or problem. We'll be happy to work with you.

WRITE DEPT. GF-17

Request Magna-Lock as *original* equipment on your new machines.



Hanchett MAGNA-LOCK CORPORATION

BIG RAPIDS, MICHIGAN, U. S. A.

designers and makers of a complete line of magnetic chucks and devices.

Use postpaid card. Circle No. 208

Reprints

Available on request are the following free GRINDING and FINISHING reprints:

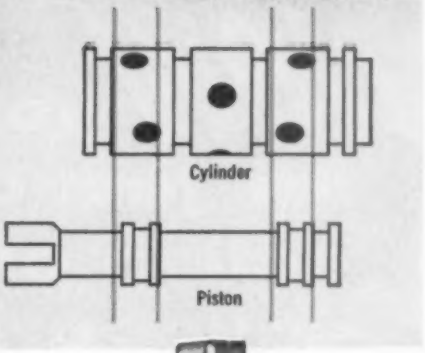
1. **Precision Grinding and Lapping at Sundstrand Aviation** by Jack Kenyon. Summary of interesting operations on aircraft accessory parts in one of the nation's leading high-precision shops.
2. **Determining Diamond Concentration in a Diamond Wheel** by F. W. Lindblad. Concentration of diamond particles, their size and arrangement all vitally affect diamond wheel performance.
3. **Belt Grinding Gas Turbine Parts** by Leo F. Byrnes. Belt grinding operations are vital to production of General Electric stationary gas turbines.
4. **Classifying Tool Steels by Grinding Characteristics** by J. A. Weir. Selection of proper grinding wheels for tool steel grinding.
5. **Finish Measuring Techniques** by E. W. Bolles. Keep up with the latest ASA standards on surface roughness.
6. **Workholders and Drivers for Precision Grinding** by Harry Conn. A summary of recent developments in workholding devices.
7. **Gear Honing.** New process uses honing principles to generate gear teeth. Improves gear sound characteristics.

Also available, at 35c per copy:

8. **Centerless Grinding** by G & F Editorial Staff. Reprint of a comprehensive five-part treatise on centerless work, including advantages, applications, economics, fundamentals, methods, machines, attachments, blades, setups, wheels and common troubles encountered.
9. **Organizing and Operating a Precision Barrel Finishing Department** by Morris S. Shipley and William A. Biebel. How yesterday's rough-and-tumble methods have given way to precision barrel finishing. 30-page report covers applications and limitations, selection of equipment, media and compounds, methods and hints to operators, and organizing and operating a department.

Address reprint requests to: GRINDING & FINISHING, 222 East Willow Ave., Wheaton, Ill.

MATCH PISTON LANDS TO CYLINDER PORTS PRECISELY WITH SHEFFIELD'S MICRO-FORM GRINDER



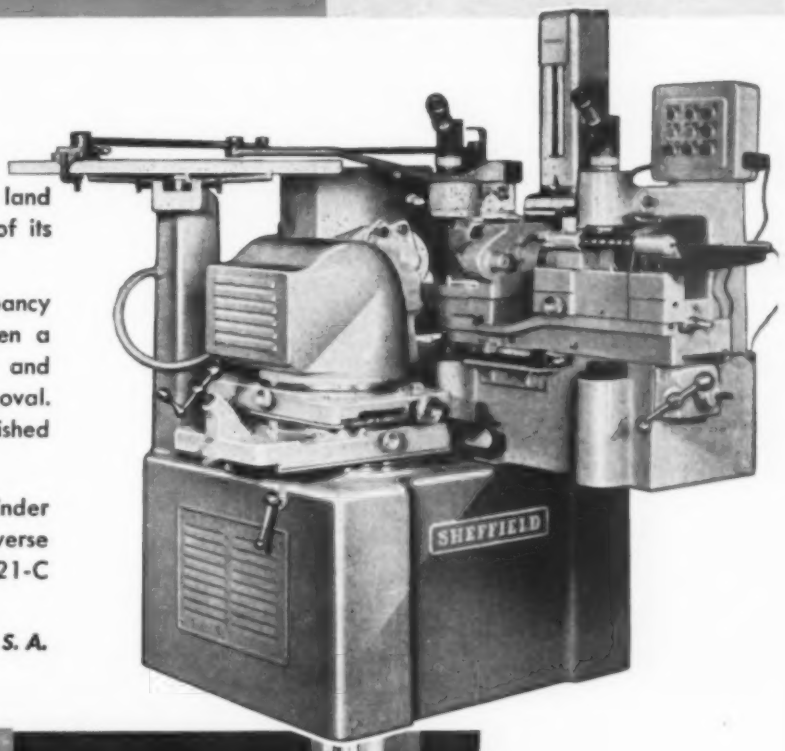
This servo cylinder and piston are typical of the very precisely machined hydraulic components in aircraft propeller and flight control systems.

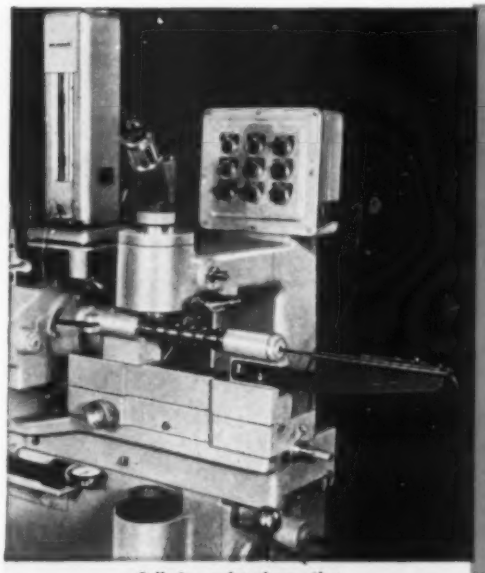
With the actual cylinder as a reference, each piston land is individually ground to match the inside edge of its respective cylinder port.

If a flow test then reveals the slightest discrepancy between land and port edge, the piston is given a finishing touch, using a Sheffield Precisionaire and Airetest Indicator to show progress in stock removal. Thus, the correction of the land face can be accomplished to within ± .000010".

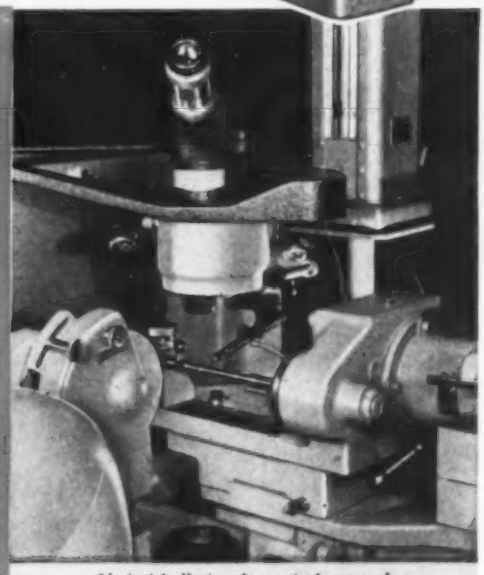
This is typical of the wide range of Micro-Form Grinder applications in duplicating precision profiles or reverse profiles from a master. Write for Bulletin MFG-121-C to Dept. 6,

THE SHEFFIELD CORPORATION, DAYTON 1, OHIO, U. S. A.





Cylinder under observation on auxiliary table.



Airetest Indicator shows stock removal in final correction.

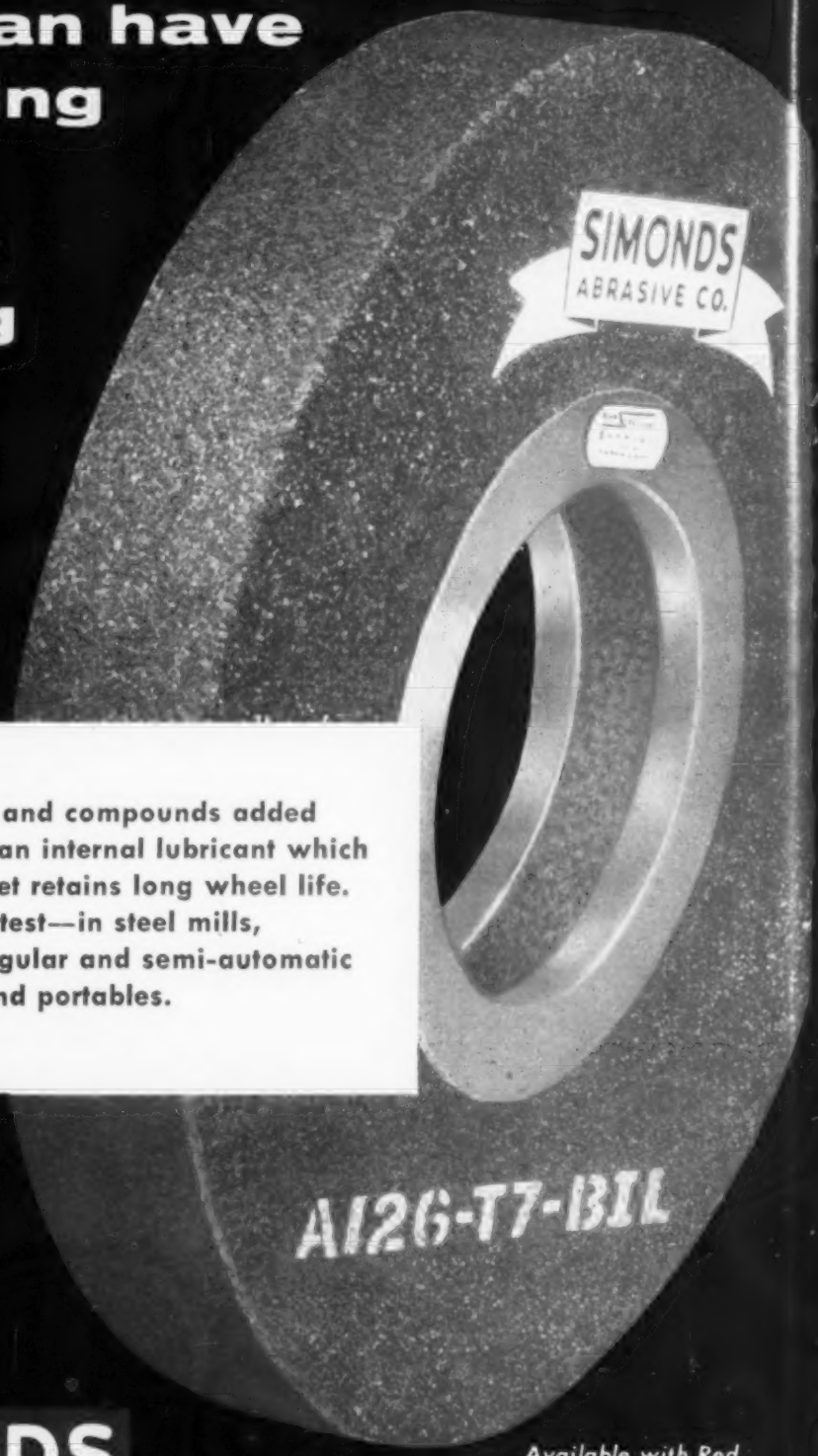
7560

GOLDEN ANNIVERSARY

SHEFFIELD

Use postpaid card. Circle No. 209

NOW you can have the fast cutting action of a softer grade with the long life of a hard wheel



It's in the wheel mix! Special chemicals and compounds added to conventional resinoid bonds provide an internal lubricant which increases the abrasive cutting action—yet retains long wheel life. Demonstrated and proved—in test after test—in steel mills, foundries and industry generally—on regular and semi-automatic swing frame grinders, on floor stands and portables.

Try

SIMONDS ABRASIVE CO.

Available with Red Streak Flanges — for metal to metal fit on mounting equipment — another Simonds Abrasive exclusive.

SNAGGING WHEELS with *New* IL BOND

NOW for longer, faster action in heavy-duty grinding . . .

SIMONDS

New IL BOND

IL Bond gives a distinctly different grinding action—cutting rate is increased *without* affecting wheel life. If your present *cutting rate* is satisfactory IL Bond in harder grade will give longer life. If your present *wheel life* is satisfactory IL Bond in same grade will increase cutting action. Write for descriptive bulletin.

What goes in here . . .

. . . Makes a BIG difference here!

SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., Philadelphia 37, Pa.

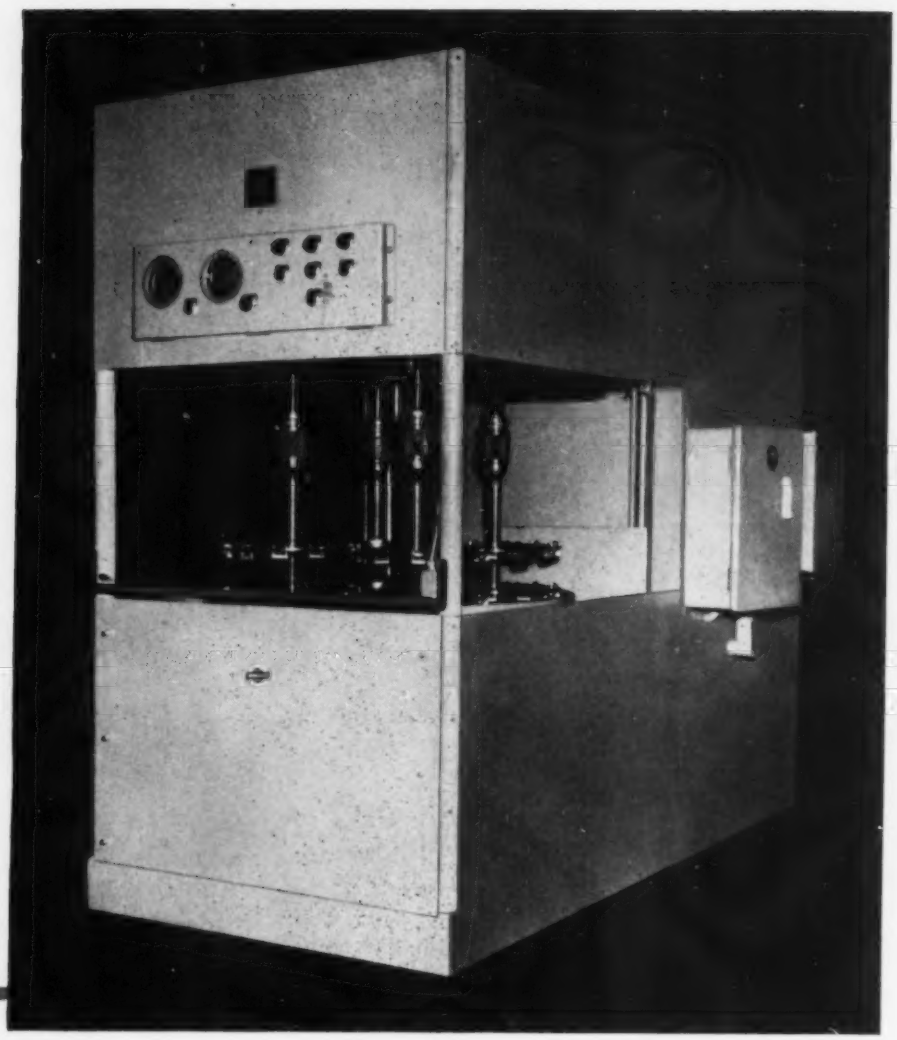
DIVISION OF SIMONDS SAW AND STEEL CO.

BRANCH WAREHOUSES: BOSTON, DETROIT, CHICAGO, LOS ANGELES, SAN FRANCISCO, PORTLAND

TUMBLE
GRAV-I-FLO
FINISH

OFFERS

Spin-Finish



AN ENTIRELY NEW PARTS-FINISHING PROCESS

Replaces hand and automatic buffing!

- ☑ One-operation finishing, even of the most complex parts
- ☑ Completely dry process . . . no lubricants needed
- ☑ Dust and fume free . . . no need for exhaust or ventilating systems
- ☑ No set-up time required for changing jobs

Sets New Standards In Pre-Plating Finishing Costs

Wipe the slate clean of all present concepts of speed, efficiency and costs in pre-plating finishing of brass, zinc-base and aluminum die-cast parts! In one short, automatically-timed operation—and on a *multiple mounting* of parts—new SPIN-FINISH produces surfaces and lustre equal to or surpassing that of buffing.

Savings on time, labor and plant space are tremendous! Eliminated are vast exhaust and ventilating systems! You'll want to learn all about this startling revolutionary method of finishing. Write for complete information now.

GRAV-I-FLO CORPORATION

Dept. GF 1, 400 Norwood Avenue, Sturgis, Michigan

Use postpaid card. Circle No. 211

Cutting the cost of finishing 79% is typical of results achieved in "Abrasive Tech" Methods Rooms. In this case, the manufacturer uses an Openkote Garnet Cloth 100-J belt, with a serrated rubber contact wheel, to sand this golf-club head and neck. The same type of belt is then used with a harder durometer, 8-in. wheel to remove scratches from the aluminum sole and polish it. Finishing costs have dived from 4½ cents per head to 1 cent. Maybe your production can benefit similarly from Behr-Manning technical service.

Very often a Behr-Manning methods engineer can provide a helping hand with different finishing problems. Just call the nearest B-M office for a date. There are 17 well-equipped "Abrasive Tech" Methods Rooms, available for problem-solving, or helping finishers brush up on new techniques: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Grand Rapids, High Point, Indianapolis, Los Angeles, Teterboro, Camden, San Francisco, Seattle, St. Louis, and Brantford, Canada.

BEHR-MANNING CO.

Troy, N. Y.

A DIVISION OF NORTON COMPANY NORTON ABRASIVES

BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

BEHR-MANNING ®

From coast to coast there's no grinding wheel service like Norton..

for your General Purpose Grinding or your High Production Jobs

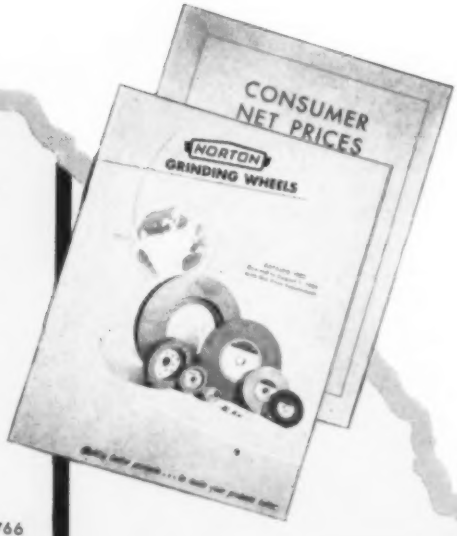
PACIFIC OCEAN

Norton Nation-Wide Service Is Complete

Your Norton Distributor is one of over 315 in the United States. His men are trained to help you in grinding techniques and wheel selection. Also, he's ready to call in a Norton Abrasive Engineer for expert aid in any of your complicated grinding problems. His sizable grinding wheel stocks are fitted to the needs of his area — and they're backed by the world's largest stock, located in five Norton warehouses, as well as at Norton's Worcester headquarters. Norton manufactures grinding wheels on both coasts, at Worcester, Mass. and Santa Clara, California.

Get These Facts and Prices

The new catalog *Norton Grinding Wheels*, Form 1052, brings you a lot of general purpose information and describes wheel specifications that will bring you best results. Every item in this catalog is available from stock. Included is a new supplement showing net prices. Get one from your Norton Distributor. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts. **For the booklets or other information write to Norton Company, Worcester 6, Mass.**



W-1766

N
W NORTON E
S

ATLANTIC OCEAN

Norton Wheels Meet Every Possible Need

Norton makes a really complete line of grinding wheels to save you time and money across the widest range of grinding jobs . . . adding the same profit-boosting "Touch of Gold" to your general purpose grinding as to your production jobs. Norton wheels are made in every abrasive-and-bond combination you need, including the new, revolutionary 44 ALUNDUM* abrasive that's tops among all non-premium priced aluminum oxide abrasives.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES

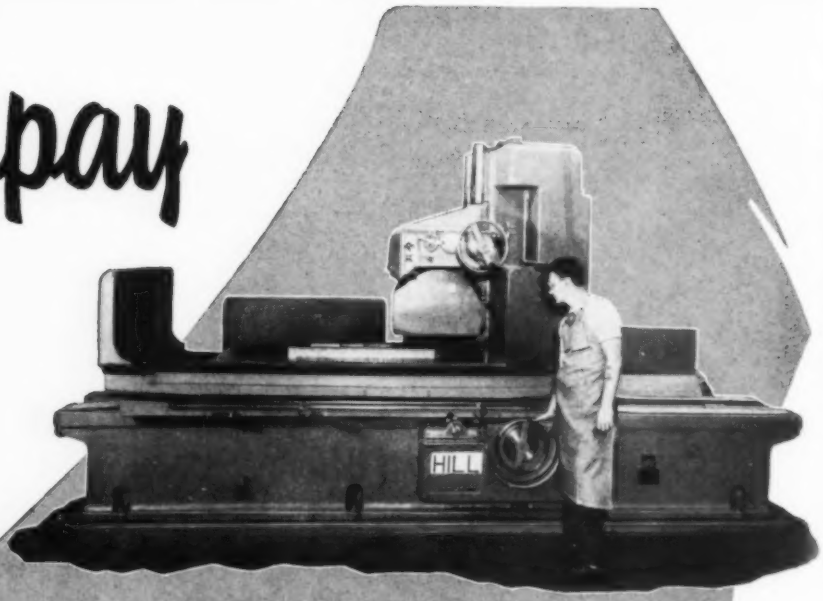
Making better products . . . to make your products better

NORTON PRODUCTS:
Abrasives • Grinding Wheels
Grinding Machines • Refractories

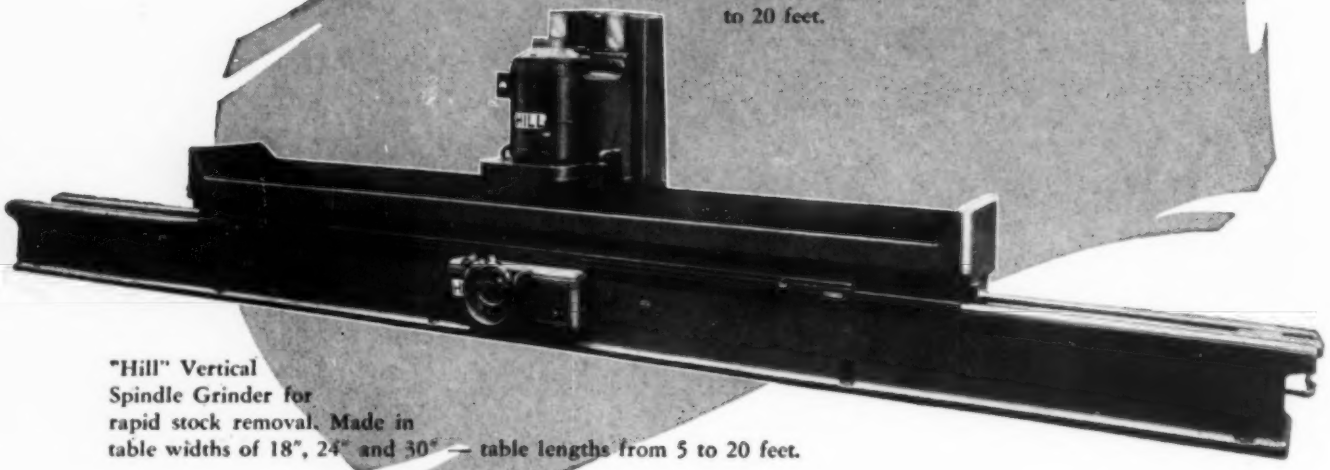
BEHR-MANNING PRODUCTS:
Coated Abrasives
Sharpening Stones • Behr-cat Tapes

Circle No. A2 on postpaid card

It should pay you too!



"Hill" Horizontal Spindle Grinder for a wide range of precision grinding. Made in table widths of 18", 24", 30" and 36" — table lengths from 5 to 20 feet.



"Hill" Vertical Spindle Grinder for rapid stock removal. Made in table widths of 18", 24" and 30" — table lengths from 5 to 20 feet.

Every manufacturer of heavy duty precision surface grinding equipment has:

- √ **Testimonials from satisfied users.**
- √ **Records of fine finishes produced.**
- √ **Case histories of phenominal savings over other finishing methods.**

But there are other important factors that should be considered:

- √ **Maximum accessibility and control simplicity.**
- √ **Minimum maintenance over the years.**
- √ **Longer accurate production life due to proven design methods, rigid construction and vibration-free operation.**

It has always paid the users of HILL Open Side Hydraulic Surface Grinders. It should pay you too!

Look for the added considerations before you buy!

THE HILL ACME COMPANY

1209 WEST 65th STREET • • • CLEVELAND 2, OHIO

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

Circle No. A3 on postpaid card

The Editor's Page

Hail! The Mighty Gazers!

January is the time of the year when an important indoor sporting event takes place: crystal ball gazing. The game is not limited to the professionals, amateurs are welcome. In fact, some wags insist crystal ball gazing is played only by amateurs, but we really don't believe this serious charge. Crystal ball gazing dates back even to the days of the Babylonians and the Simians and with the growth and development of the profession it branched out into alchemy and astrology. Nonetheless, to give the wags their due, maybe an attempt should be made to define amateur and professional crystal ball gazers: an amateur is one who looks into the ball and sees money; a professional looks into the ball for money. Whatever definition strikes your fancy let us take nothing away from these honorable gentlemen and their worthy profession.

1957 will be a splendid year! The first half as good as the latter half of 1956, but the last half will bear watching. Weak spots here and there . . . could become serious . . . overall should be good. Capital equipment purchases expected to stay high . . . watch for tight money to possibly exert contrary pressure. Unions claim tight money a money-making device of bankers to squeeze working man . . . will influence business conditions . . . see trouble ahead unless gov't launches social program. Business to slacken . . . peak reached . . . what goes up must come down. Credit approaching danger point . . . consumer over extended on hard good purchases . . . collections far behind. Auto industry sees big year ahead. Too many soft spots . . . may affect others . . . watchful waiting urged. Sales to advance but profits will drop. Lower sales but higher prices . . . will keep profits level.

And so on ad infinitum!

All of this is a rather splendid demonstration of broken field running, sturdy, clean blocking on a dry, hard field. Sometimes one wonders if too much attention is not being given to the professional prognosticators and not enough to one's own common sense—not that the pros don't have their place, they assuredly do, and more power to them—but it does appear that a highly lucrative business exists in peddling, at exorbitant rates, crystal ball information to business men. Too often the crystal ball is cracked!

You ask: how does GRINDING AND FINISHING feel about the future? I'm a tea leaf reader and nothing would please me more than to brew you a cup of tea and we'll both have a long, searching look at the dregs. All kidding aside, get eight hours of sleep, eat three square meals a day and don't worry!

A happy, prosperous and healthy 1957 to you all!

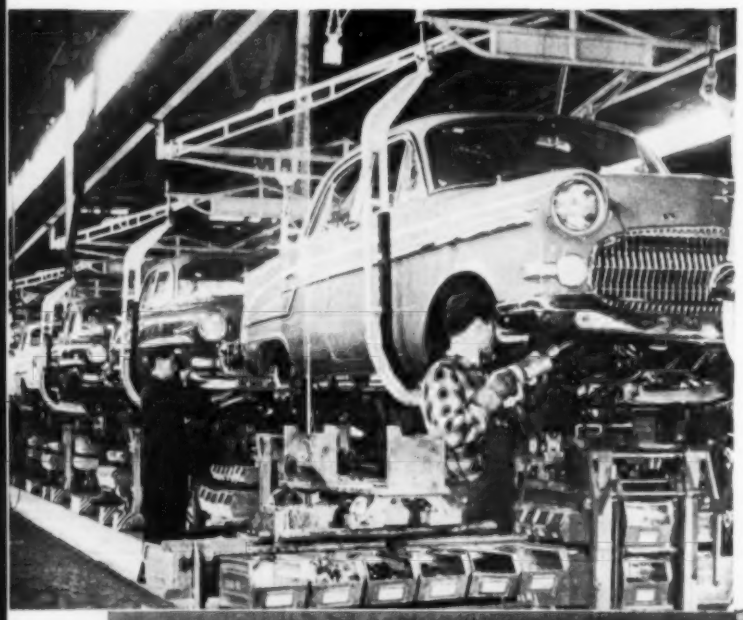
Wm. J. Schleicher

Editor

By **William F. Schleicher**
Vice President and Editorial Director
Hitchcock Publishing Co.

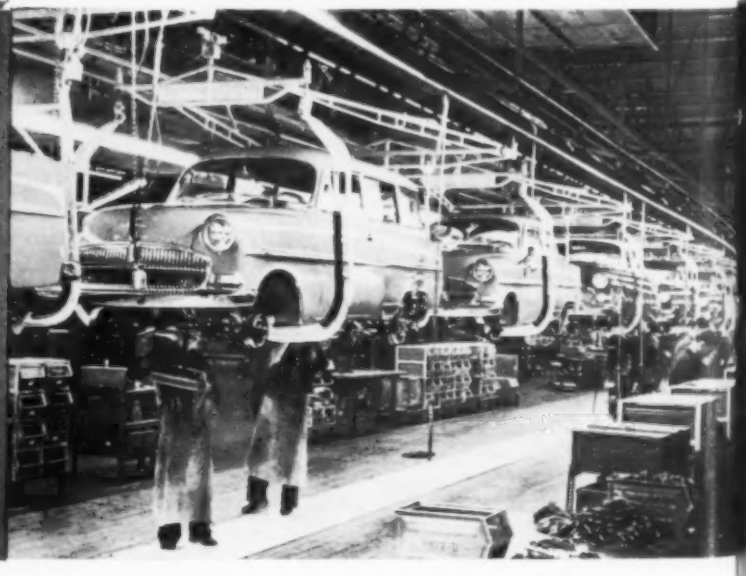
An on-the-spot report of

German Production Methods Today



FINAL ASSEMBLY at Adam Opel A. G. Bodies have been assembled with chassis and engine. Assembly fixtures are moved out of the assembly line for return to their start position to repeat their cycle of constantly bringing new engines and axles to car final assembly.

RIGHT: Hanging from a monorail overhead conveyor, the Opel car receives its final assembly operations from below.



● Most impressive feature of West Germany, 1957, is the sinewy vitality of its people. This is no longer a war shattered nation, ragged, despondent, complaining and existing on handouts. It is vibrantly alive, ambitious and working with dogged determination at carving out their niche in the world of nations. They've scratched and climbed their way out of the rubble into the sun and any comment on their accomplishments must be made only in relation to their situation at the end of the war.

Facilities and equipment were, at war's end, either partially or completely destroyed, and what wasn't damaged had been stolen by the Russians and others. Capital was almost unobtainable until the Marshall Plan provided credit and capital for reconstruction. Until the currency reform of 1948 financial problems

CRANKSHAFT grinding line at the Volkswagen plant in Wolfsburg on the Mittelland Canal.

were aggravated by general unemployment, millions of refugees from eastern and south eastern Europe and the homelessness of millions of civilians. In the words of a German machine tool builder, "Things were in a mess."

Today factories are rebuilt, new plants rise out of the ruins, equipment is being replaced and everyone is hard at work. German goods are appearing in world markets and many nations know that an old competitor is back in business. Machine tools are a

LEFT: Body presses at Volkswagen Works has automatic transfer of stampings.

RIGHT: Final assembly line at Volkswagen Works.

continued

splendid example of German resurgence.

You may remember the German machine tools of 1952! If you didn't tie them down with chains, hawsers and bolts they hopped about the floor like sprightly kangaroos, a danger to life and limb. Rigidity, and mass were not their strong points; nor did they have too much power. They were generally light machines with inadequate driving beef. Metals were often inferior. Attachments and accessories were a problem and too frequently spindles and wear parts were too weak or too soft. Maintenance, due to awkward locations of hydraulic and electrical circuits, became a headache to many maintenance men.

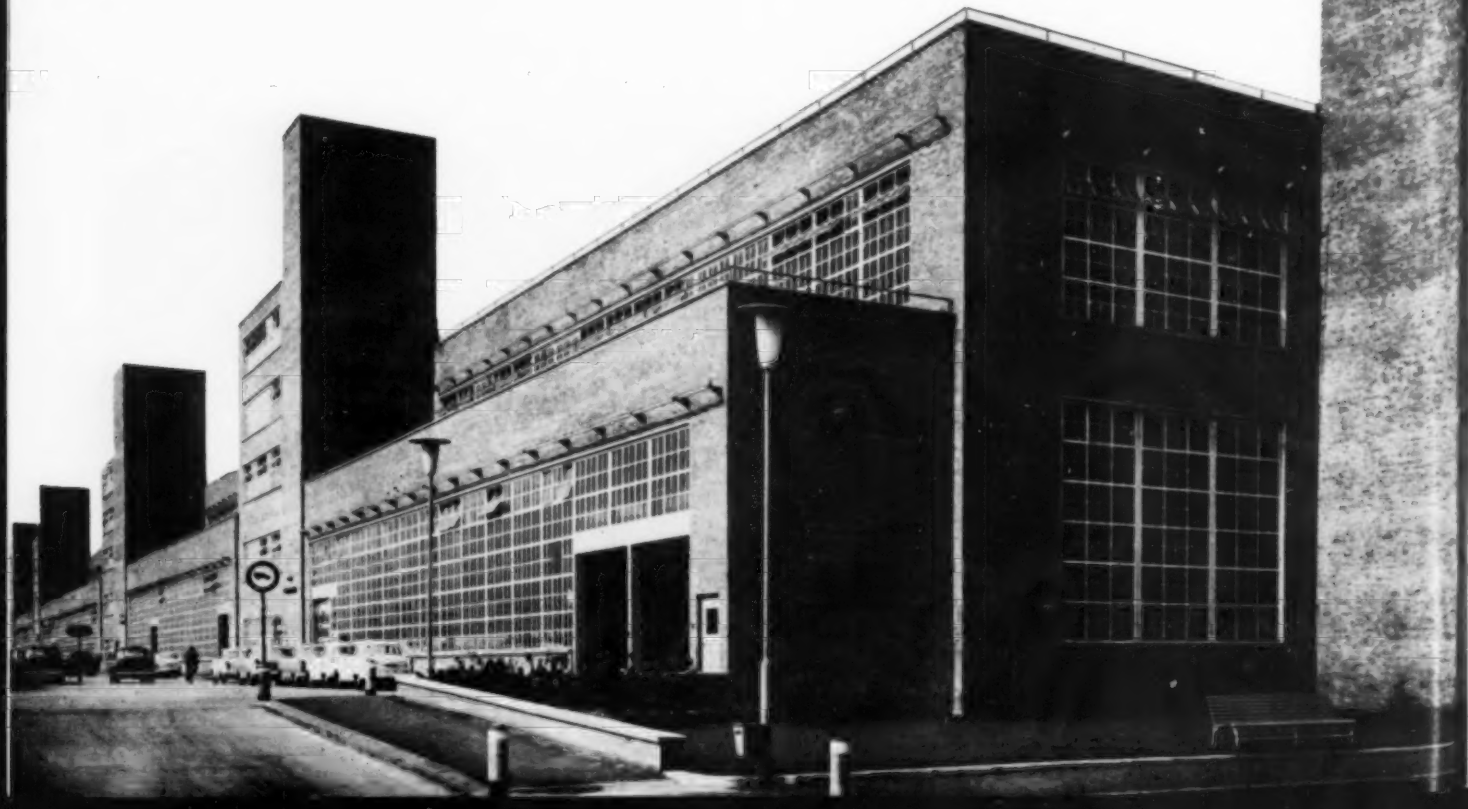
The situation has changed!

German machine tool builders have not spared the midnight oil. Today's machines are more rigid, heavier and stay put on the floor; they've added power and automatic controls and eliminated weak parts. Wear parts are hardened, circuits are easily accessible. Attachments and accessories are available (if not already built into the machine) and the entire unit is manufactured to the highest standards of craftsmanship and accuracy.

Much effort is being expended by German engineers in the direction of ultra accuracy with the help of optics, as well as in the direction of automatic controls. They are as anxious to reduce the human element of fatigue, inaccuracy and cost as much as possible. While great strides have been made in this area as far as standard machines are concerned they are still a long way from special machinery. Much needs to be done in this quarter; however, as mass sales introduce (through necessity) mass production special machines will unquestionably be built.

There is very little to differentiate the German shop from its American counterpart. We saw much more hand labor, fewer automatic attachments such as loading and unloading devices, hydraulic holding

PROMINENT TOWERS divide the 425 meter long wall of the new plant at Adam Opel AG., in Russelsheim. The plant is among the most efficient in the world, and is divided into five equal sections by the towers. The new building combines the 34 press lines of the sheet metal shop with body manufacture and car final assembly to one gigantic layout. Opel has based its plans on achieving a production rate of 1000 passenger cars, delivery vans and trucks per day in 1957, working two shifts per day.



PANORAMA of Hamburg, Germany, showing the ships in dock on the River Elbe.

devices, automatic indexing fixtures, etc. While American accuracy is built into the machine in some of the German shops we visited, the accuracy is built into the operator. German industry still, through necessity, works with machines of old and noble vintage, although replacement is proceeding at a fast pace. A large labor force is required to perform the same operations that here would be done with less help.

Such grinding operations as we saw showed splendid practice. While there are many shops in West Germany which can make a grinding wheel do anything but sing the Anvil Chorus, generally speaking, we saw nothing which isn't done as well by American manufacturers, or which could be done, if necessary.

Volkswagen and Opel Plants

We were particularly interested in two automobile plants, G-M's overseas affiliate, Opel, and Russelsheim, and the Volkswagen Works at Hannover and Wolfsburg. (Technical articles dealing with some of the operations at these three plants are in preparation for early publication). The Opel plant leans heavily toward transfer machines and automatic production methods. Some of their lines are as good as anything done by Detroit, some are even better. Gunard Winstrom and his associates, working with German and American machine tool builders, have done a remarkable job. It is definitely a plant worth visiting.

The Volkswagen Works at Hannover is primarily a stamping plant; the Volkswagen delivery trucks are also assembled here. It is a modern, efficient and beautifully organized plant which need play second fiddle to no similar establishment. At Wolfsburg, the main plant of Volkswagen, the passenger cars are

VOLKSWAGEN plant of Hannover.

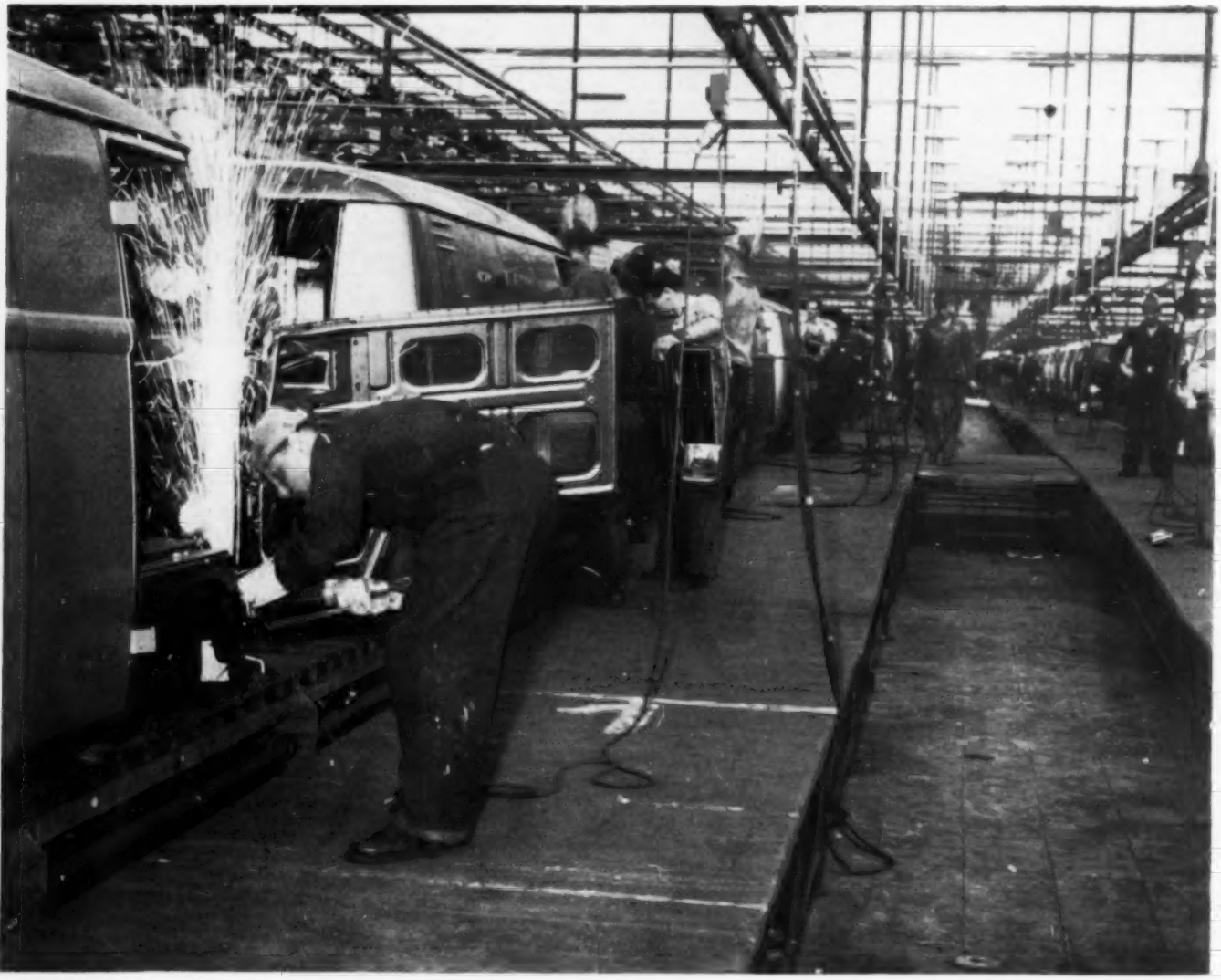
German Production Methods

continued

built and assembled. The impression one receives here is one of custom building. There were no transfer machines and very little of automatic production methods. Their end products show a high degree of craftsmanship and accuracy.

Apprenticeship Training

Apprenticeship training programs are in full force in all metalworking industries. Not only machine tool builders, but automobile and general manu-



REINFORCED flexible wheels are used during surface treatment operation of bare body on Volkswagen truck line at Hannover Works.

facturing plants are training skilled help in large numbers. From this phase of their activity American industry can learn much. No matter how automated an industry becomes, there will always be a crying need for the skilled craftsman. American industry feels the need now; it is unfortunate that so little is being done to train skilled help.

A corollary to the apprentice training program is one interesting fact that makes a great deal of sense: some of the German industries are using the more talented of the graduate apprentices in assistant engineering positions. The scarcity of engineers is as acute in Germany as it is in the U.S. One method of overcoming this shortage is the addition of engineering assistants.

In this capacity, after having been given additional schooling, they perform routine engineering work: writing reports, conducting tests, assembling information, conducting studies and discharging all those multifarious engineering duties which rob a full fledged engineer of his creative time. With the help of these assistants engineers are free for creative work without having to worry about noxious details.

German Concept of Grinding

While research is going ahead under a full head of steam there are few revolutionary items of interest to the grinding industry. Electrolytic or similar grinding is as far advanced as in this country and used as much. There is little that's new in grinding wheels, as far as universal or widespread use is concerned. There are some interesting installations using porous wheels and graphite wheels, the latter being used for centerless lapping and cylindrical lapping. The use of reinforced flexible wheels appears to be more widespread in Germany than in this country; however, neither superiority nor inferiority as compared to American wheels could be discerned here. Some users with whom we talked gave the impression that American wheels were frequently superior to German wheels because of their high degree of uniformity. It is interesting to note that certain types of machines used in the manufacture of grinding wheels are made only in Germany.

The impression received was that the Germans look upon grinding as a basic metal removal operation and not merely a method to impart final surface finish and obtain dimensional tolerance as is so often the case in this country. And yet we saw many operations performed by milling machines which should have been performed by grinding.

Big Need: Expanding Markets

While industry has made a fantastic comeback many problems still face the German economy: war costs, high cost of modernizing machines and plants, high cost of many manufactured articles and of course the desperate problem of recapturing world

Train Ride in Germany

First, decide whether you're traveling first or second class (third class has been abolished); then decide which train you're going on. There are a number of different kinds, the fast ones exact an additional charge. Armed with your desires you purchase a ticket. This latter is a fast speedy operation, handled by a ticket machine in seconds. You are now ready to depart. First, show your ticket to the gate guard who makes certain you have a ticket and punches it. (No possibility of sneaking through here, you late arrivals, no tickee no trainee.) You settle in your seat and from your window you watch a man pop up from nowhere; he stands erect, he raises a paddle, the train moves, the little man disappears into thin air. Through the train marches the conductor, pleasant and courteous. He checks: 1, whether you have a ticket; 2, if it was stamped by the gate guard? 3, to see if you are on the right train? And if you boarded the train without a ticket? Ha, ha, you're a sly one—the wheels of justice turn slowly, but brother, they turn. Five marks penalty, please.

However, you're honest; ticket in order, you settle back and arrive in Hamburg. Again the gate guard, who checks: 1, whether you have a ticket; 2, have you arrived in the same city as the one shown on your ticket; 3, was it punched by the guard of the city of departure; 4, was it marked by the conductor on the train? Pass this gauntlet and you're in, brother!

Just remember, when traveling German railroads, ya gotta' have a ticket! Because every possible travel contingency is regulated and guarded against, there can be no errors in judgment or mistakes. This is questionable efficiency, certainly a waste of man power.

On the other hand, the trains run punctually. Inexorably as the stars which pursue their placid and prescribed course in the sky, German trains leave and arrive on time. For the weeks I was in Gemany I set my watch only by train departure and arrival. The same feeling of craftsmanship motivates the railroad engineer which rallies all German workers, the efficient discharge of the job, pride in workmanship. Whether one builds machine tools, operates a boring mill, sells an industrial product, or drives a train: the German does the job right, and he does the job well. There can be no compromise with craftsmanship.

continued

markets. The need for markets is not a matter of desire for profits or expanding sales as it is a dire economic necessity.

The crying need of European nations, among them Germany, for international trade is immediately apparent to the visitor. Stimulating such trade is the backbone of their very existence.

What is their attitude towards Americans? We talked with industrialists, business men and many common people: not once did we hear any anti-American sentiment. Everyone was generous in praise and quick to mention that without American help recovery would have been impossible. Today's economic and political thinking is in line with American thinking, and it is refreshing to visit a nation which has rebuilt and made a comeback, openly acknowledging help, and which has done so without childish economic and social experimentations. In spite of less Marshall Plan aid than some other nations they have not stumbled from crisis to crisis in a seemingly endless circle.

At no time did we meet the type of German businessman associated with pre-war Germany: domineering, haughty and arrogant. Today's businessman is efficient, friendly and courteous. Much of the vaunted German efficiency is still in earnest evidence, although efforts are being made to eliminate much of the ridiculous efficiency which results from layers of layers of bureaucratic rules and regulations. Everything must be so ordered that no possibility of error exists. A rule or regulation is provided for every contingency. While this, in a small measure, is worthwhile, when carried to extremes it is nonsense and a great waste of effort.

When a zeal for craftsmanship is coupled to a dynamic will to succeed and to a herculean capacity for labor, combined with an ambition to regain stature and respect in the world—and when this is all predicated upon dire necessity to succeed for bare existence's sake, it becomes apparent that here is an economic challenger, if not for world economic supremacy, to European economic supremacy. ● ● ●

NIGHT SCENE of Hamburg business section.

Grinding and Finishing in Chrysler's TorqueFlite Transmission Plant

By **Jack Kenyon**
Managing Editor

- Interesting abrasive operations at Chrysler Kokomo include many multiple-surface cylindrical grinding jobs using angled-wheel grinders.
- Central coolant purification system serves most grinding operations.
- Abrasive blasting does 85% of all deburring on transmission parts.

CHRYSLER'S new TorqueFlite automatic transmission plant in Kokomo, Indiana, tooled for the production of 1600 of the new three-speed transmissions per shift, contains many outstanding abrasive operations.

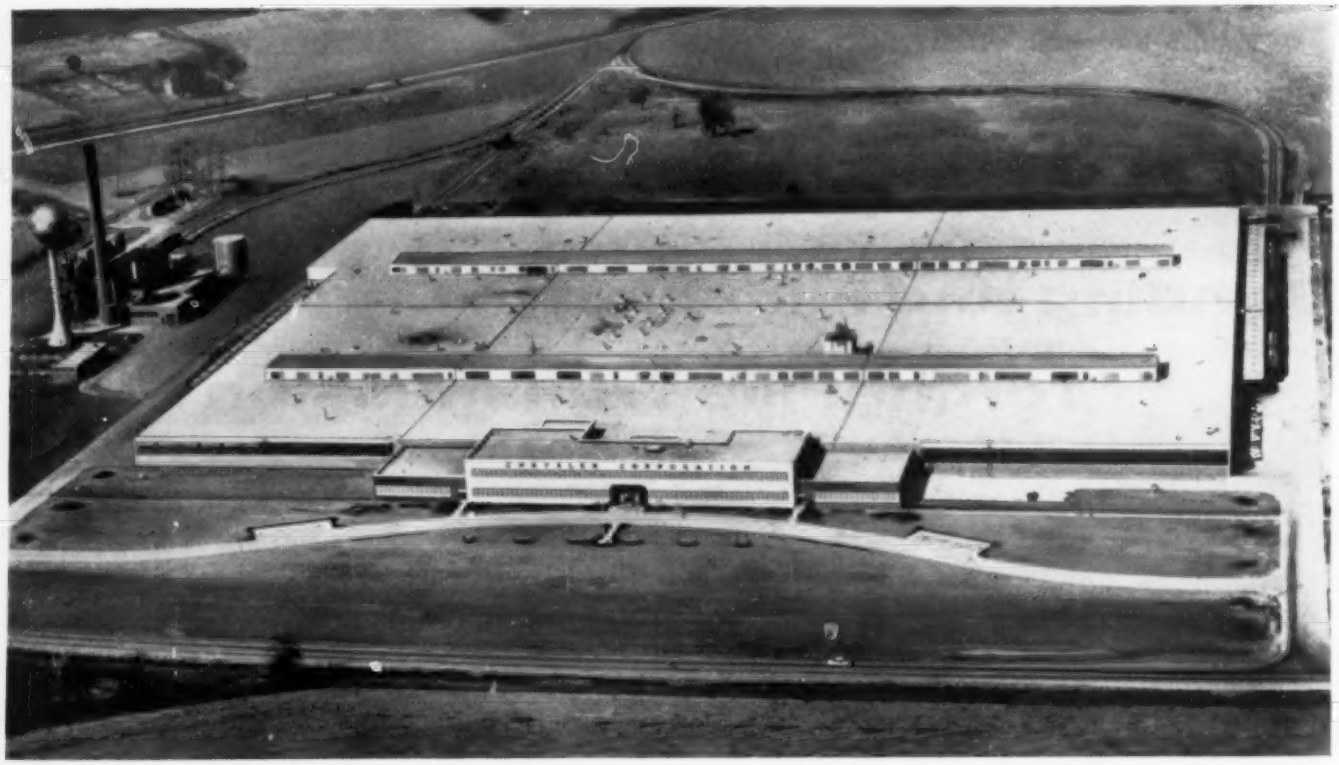
More than 1100 machine tools are in operation in the 16-acre facility, many of them linked by the latest in automatic handling devices for transfer of parts. Full automation is featured in only a few of the lines, however—the two 600-ft. transfer lines for machining the cast iron transmission case being the outstanding example.

Under the plant's concrete floor, and lacing the entire manufacturing area, is an elaborate 1½ mile long flume system for chip removal. Chips from machining are automatically washed into the systems where additional coolant carries them to a central clarifying station, to the tune of more than 6 tons of chips daily. At the clarifying station the coolant is cleansed 100 per cent and pumped back to the machining lines. Use of the central coolant systems has meant standardization of coolants for grinding operations to a great extent, but this hasn't resulted in lowering grinding efficiency appreciably.

Grinding Operations

A variety of abrasive operations are done in producing the Torqueflite's 319 major parts and 422 minor components. Thrufeed centerless lines turning out valves for the transmission's control sections are connected in tandem, most of them having centerless brushing as a final deburring operation. A typical valve line in this part of the plant leads

TORQUEFLITE'S FINAL TEST—Every completed transmission receives a thorough test under actual driving conditions before leaving the plant. Indicators on the control panel tell the operator if the unit is performing properly. After passing this test the transmission is ready for installation in a Plymouth, Dodge, DeSoto, Chrysler or Imperial car.



MANUFACTURING AT THE CHRYSLER KOKOMO automatic transmission plant takes place in this one-story building covering 16 acres under a single roof. String of 50-ft. freight cars lined up at loading dock, extreme right, gives concept of over-all size of facility. Employment is now over 2700 persons, with a monthly payroll running more than $900,000.

off with a Number 3 Cincinnati centerless grinder for the bulk of stock removal, followed by two Number 2 Cincinnati's for the remaining grinding and a final No. 2 centerless with a brush for deburring.

The Torqueflite plant has a number of new Cincinnati two-spindle chucking grinders which have been tooled for many combination OD and face jobs on transmission parts. One typical job on the intermediate support is shown in our article.

The many combination OD and face grinding jobs on the transmission's shafts illustrate the trend in high-production grinding toward multiple-wheel angled head grinders to do as many of the grinding operations on a single machine as practical. This eliminates much of the handling and helps in holding accurate relationships between surfaces. Many shaft operations have been fully or partially automated, with mechanical loading and unloading, automatic gage sizing, etc.

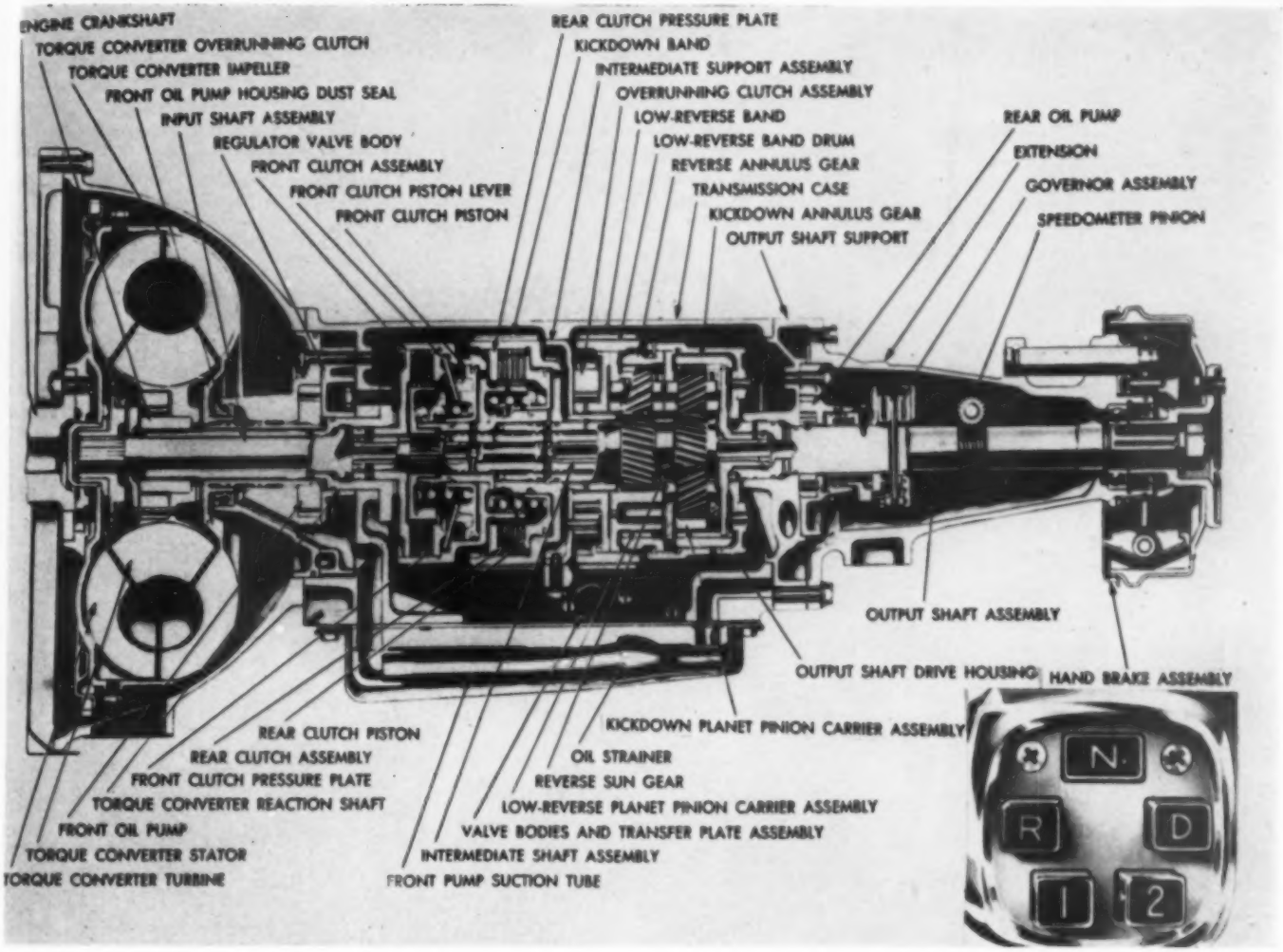
Double disc grinding of flat parallel-face parts is common throughout the plant. Even the narrow faces of clutch bands are ground in this way for flatness and parallelism on a Gardner 125 double-disc grinder.

Flat and bore honing operations include some very interesting jobs. One Model 884 Micromatic flat honing machine hones both faces of the inner and outer oil pump rotors parallel within .0005-inch and with a 15 microinch finish while removing about .004-in. stock. The machine's four fixtures each hold 10 parts for the operation. One honing operation on the bore of the planet pinion is tied in with the almost completely automated pinion line. Special 2-spindle Micromatic machines with automatic sizing equipment finish the pinion bore automatically within .0005-in. for size, and within .0001-in. for taper and out-of-roundness. Opposite faces of the pinion are also honed in a Micromatic flat honing operation described later in this article.

Deburring, an operation which comes in for special emphasis in any transmission plant, has been improved in the Chrysler Kokomo installation by the use of many blast deburring machines. Diecast aluminum parts are almost 100% subjected to blasting and conveyorized shot blasting is used for hardened steel parts as they emerge from heat treatment and Marquenching units. Mechanized Wheelabrator Shelblast units are used for the anodized aluminum parts such as valve bodies, with crushed walnut shells as the primary abrasive. Blast units are also located in the transmission case line just prior to the thorough washing of the cases.

Blast deburring throughout the Kokomo plant is responsible for reduction of hand deburring by about 85%, though some is still necessary and is done with hand grinders.

Chrysler has set up a systematized method of finding the proper grinding wheel for each grinding operation in the Kokomo plant, based on all aspects of the wheel's performance—quality of grind, number of grinds obtained per wheel, number of grinds per dressing of the wheel, and so on. When the best possible wheel for a particular operation is found,

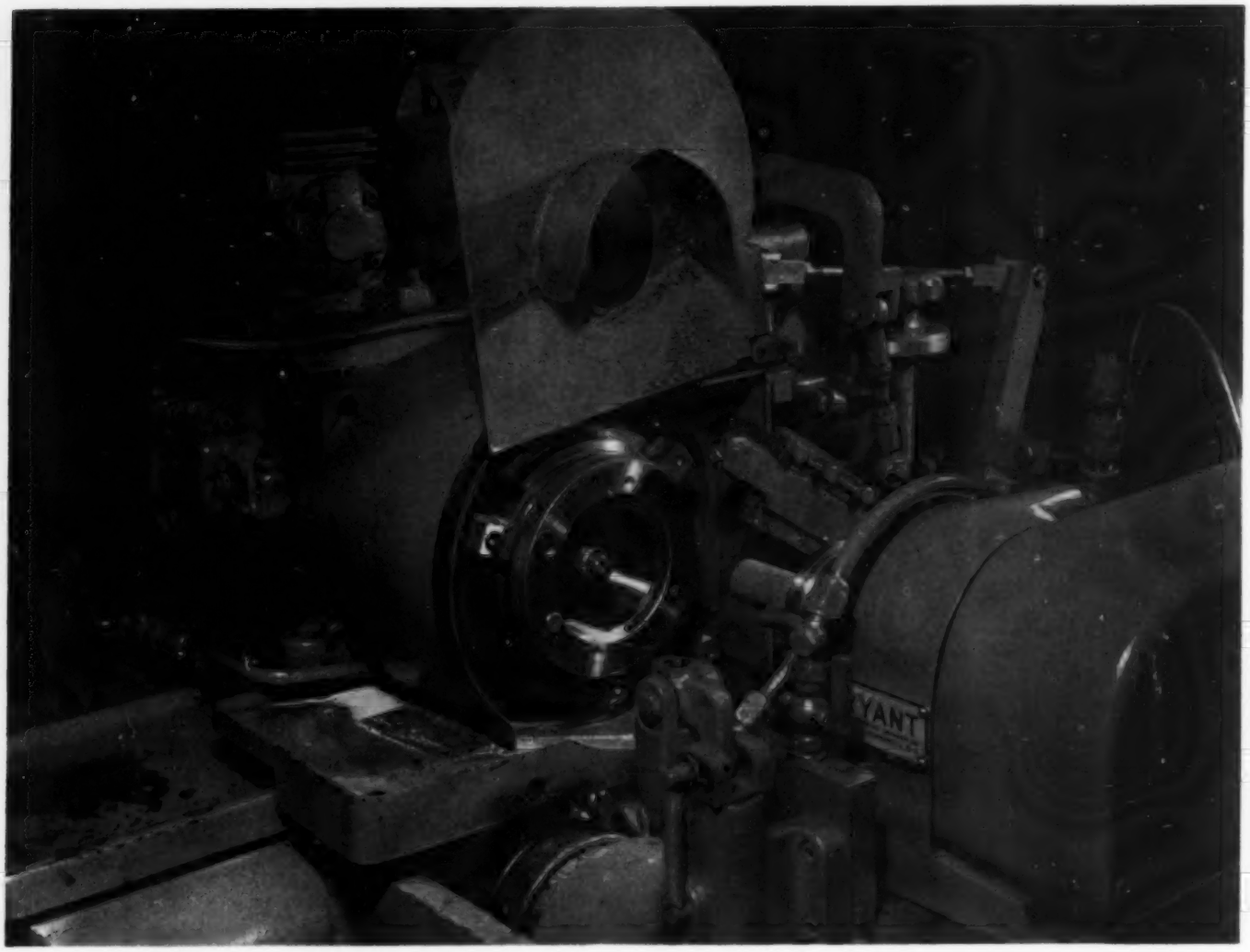


CUTAWAY OF NEW TORQUE-FLITE automatic three-speed transmission shows major operating parts of assembly. Inset, lower right, shows one of Chrysler's push-button selectors used with TorqueFlite. Production at Kokomo facility does not include torque converter, made at Chrysler's Highland Park, Michigan, plant. TorqueFlite is available on all Chrysler Corp. cars.

a standard wheel specification for the job is written and a tooling print of the wheel is prepared, showing the wheel size, complete specifications, and assigning a serial number to the wheel selected.

We're grateful for the fine co-operation of Chrysler Kokomo plant personnel in the preparation of this article, and especially to James R. Cypher, plant manager; Bruce G. Fields, production engineer; William L. Miron, plant engineer; and Joseph Napolitano, tool trouble man.

KEY MEN AT KOKOMO transmission plant include Plant Manager James R. Cypher, left, and Bruce G. Fields, production engineer, right. Cypher came to the Kokomo plant in 1955 as master mechanic and held that position at the time of his promotion to plant manager. Fields was also in on Kokomo planning, now is responsible for running production engineering staff.



FINISHED CAM LOBES ARE VISIBLE in this closeup of the internal cam grinding operation performed on a Bryant 2209 internal grinder. Specially cammed motion generates lobe contour accurate within .0005-in., gives a 15 micro finish.

CHRYSLER TORQUEFLITE
continued

Grinding Internal Lobes of Over-Running Cam

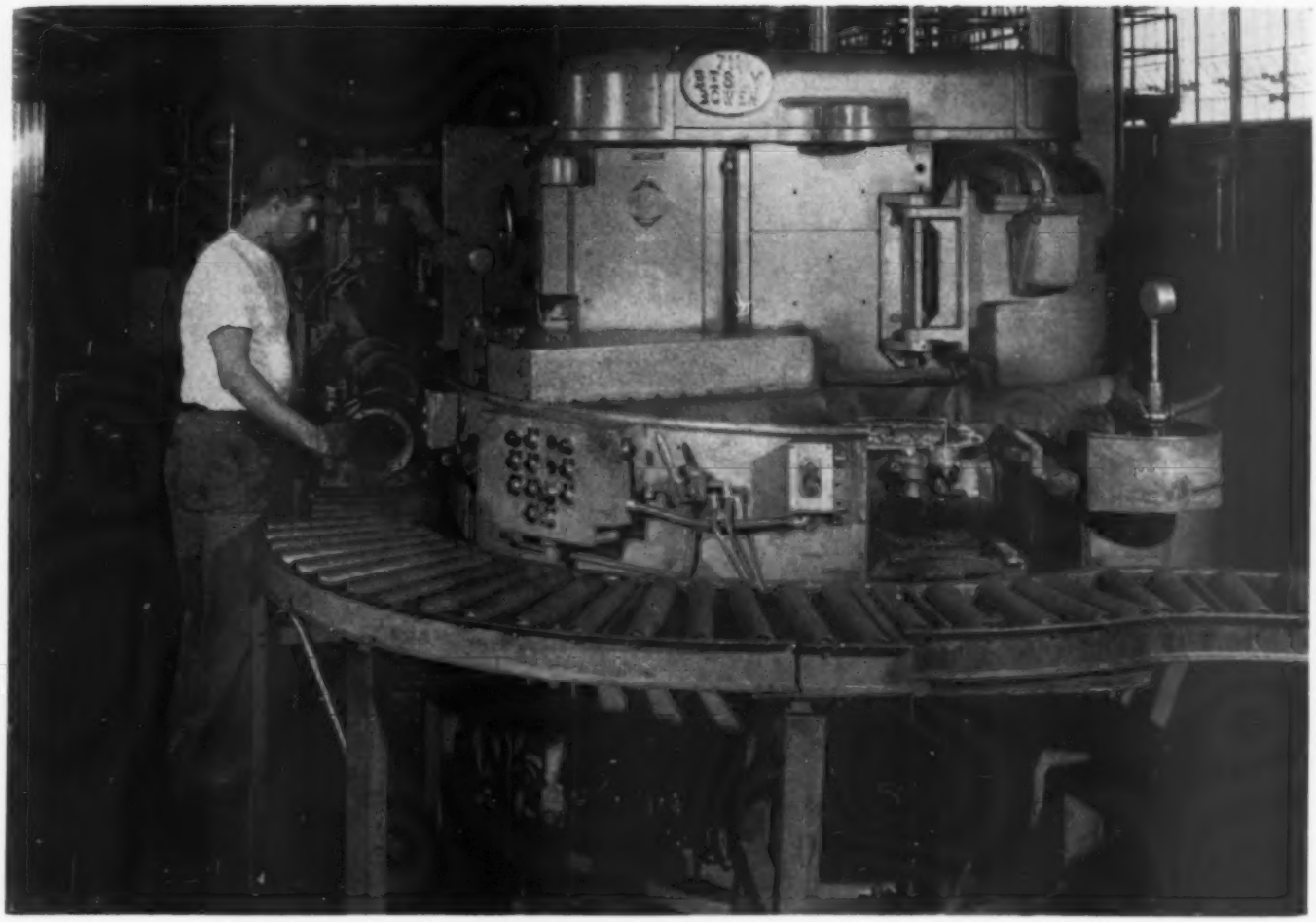
THE TEN internal lobes of the TorqueFlite's low speed over-running reaction cam are ground on a specially designed and cammed Bryant 2209 internal grinder. To obtain the proper lobe shape as the wheelhead reciprocates within the cam, the wheelslide has to follow a smooth cammed motion as the lobe is generated. Rough shaping of the cam lobes is done in a previous broaching operation, following which the lobes are brought to a hardness of 60 RC by induction hardening.

For the cam grinding operation, the cams are fixtured by hand in ring fixtures and then ground two at a time. One operator is able to operate three machines.

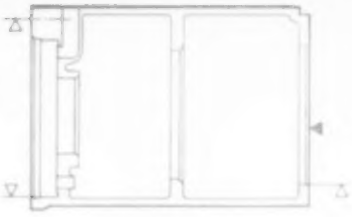
Stock removal for this operation is .010-in., and a 15-micro surface finish on the lobes must be maintained.

A single point diamond dresser dresses the wheel before each lobe is ground. The wheel used is a 1¾ x 1 x ⅜ wheel, A60 N6 V sulfur treated. Coolant is soluble from the plant's central system.

Accuracy of the cam lobe is held to .0005-in. over the entire surface. This contour is checked once every five pieces by the operator on a Sheffield 21-column Precisionnaire instrument.



BESLY BOWEN GRINDER AT END of case line receives CI cases after milling of pan face. Operator manually loads rotating fixture of empty station as grinding head surfaces part in other station. Surface must be ground for seal fit.



Grinding Transmission Case

FOR AN OPERATION that has formerly been done by slower lapping methods, Chrysler engineers have turned to semi-automatic surface grinding the pan rail face of the TorqueFlite transmission case as it emerges from the 600-feet long transfer machining lines. For this purpose, a Model 711 Besly Bowen radial surface grinder at the end of each transfer line is used. Loaded manually from roller conveyors, the grinders have special fixtures in which the cast iron cases are nested for grinding. Each grinder has two rotating fixtures and a single vertical grinding head that alternately grinds in either position. While the operator is loading one fixture, the head is grinding a part in the other.

The face must be ground for a seal fit with the valve body face without a gasket, hence the need for good surface finish (40 micro) and flatness (within .003-in.) Stock removal for the operation runs from .008-in. to .016-in., and the machine is on a half-minute cycle.

Soluble coolant from the central system is used for this operation.

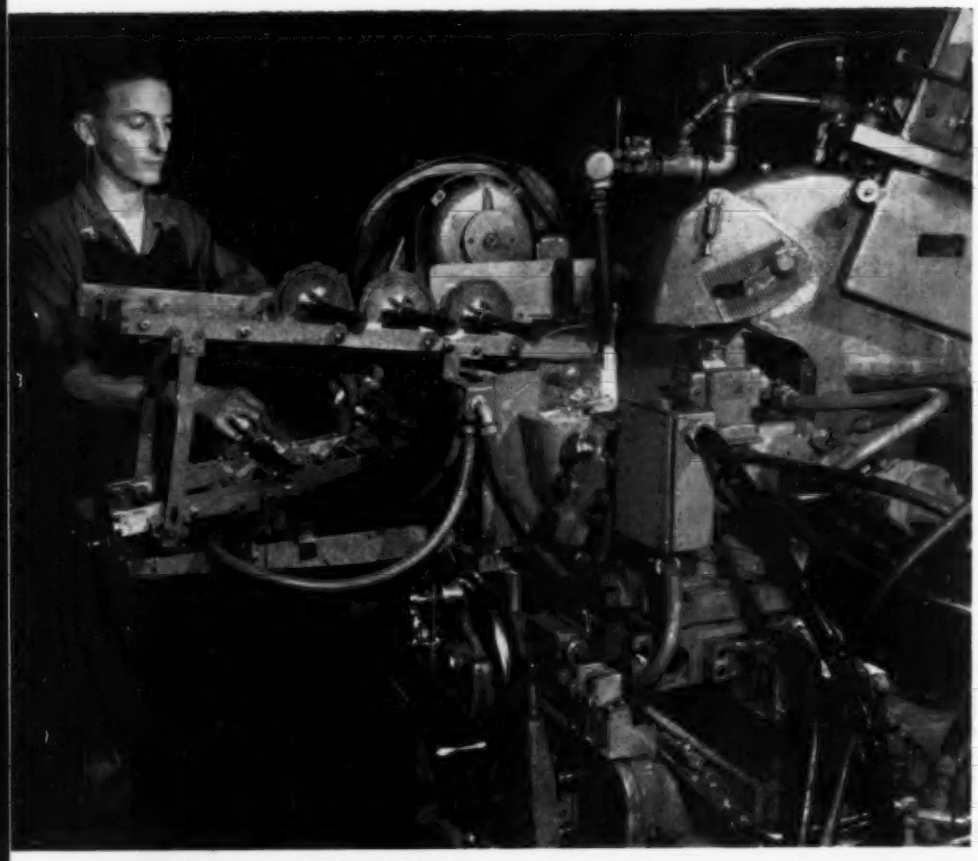
Chrysler was able to make a decided improvement in wheel performance for this operation by going to a somewhat larger wheel than originally specified and changing the grit and grade used. With an 18 x 3 x 15 wheel, 60 grit L grade, the grinders were turning out around 500 cases per wheel, with wheel changing necessary about every four hours. Production has been boosted to 3000 cases per wheel by using an 18 x 4 x 14, 46 grit M grade wheel. The six-fold increase is attributed to the thicker section of the new wheel and its much wider grinding face, together with the more aggressive cutting action of the coarse grit.

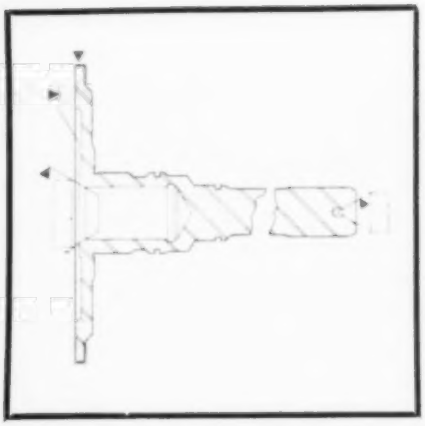
Dressing of the new wheel is necessary only once when the wheel is first mounted. Normal breakdown takes care of further dressing, and the wheel is usable right down to the studs.

PARALLEL FACES OF DIE cast aluminum alloy valve body are honed on this Micromatic Microflat honing machine, removing .010 to .015-in. stock and holding .004-in. on size with 40 micro finish specified. Twelve parts at a time are run in a two-minute cycle between the machine's six-segment 42-inch diameter wheels, whose specifications are C280 J8 B. Cutting fluid is Socony Mobil NP 6431 Super Finish Fluid plus thread cutting oil in a 16-1 ratio, cleaned by a Hoffman separator. Dressing by means of a diamond dresser is done once a day. Operator gages parts with indicator.

CHRYSLER TORQUEFLITE

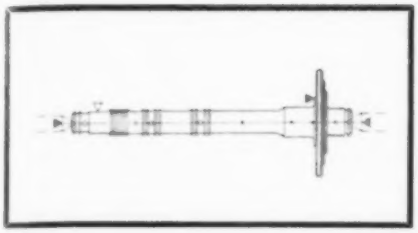
continued





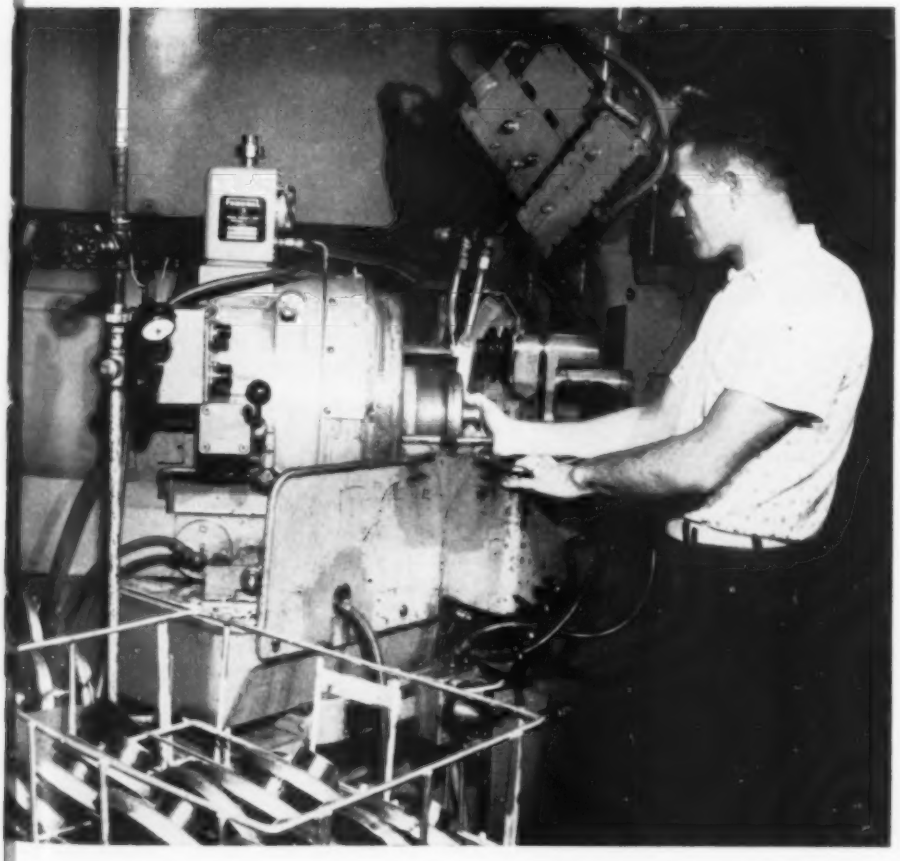
STOCK REMOVAL runs .008-.012-in. on OD, .008 on flange face. 20 microinch finish specified for OD.

NORTON 10 x 18 ANGLE HEAD grinder with completely automatic loader and unloader grinds face and periphery of interrupted flange on input shaft. Rotary carrier swings shaft in position for pickup by telescoping headstock center, and part is driven by flange lugs. 30 x 2 x 12 wheel is an A54 M5 VA, turns at 6500 sfm. One operator tends two machines, spot-checks parts with snap gage by hand. Coolant is soluble from central system. Shaft is steel forging, hardness 56-62 RC. Dressing by means of automatic cammed diamond dresser is done once every 25 parts.

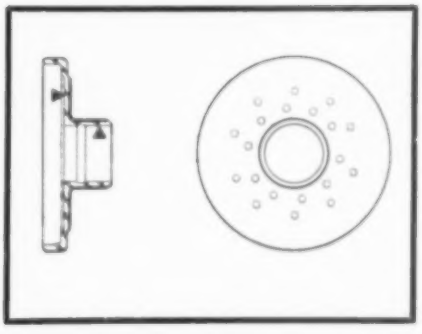


LIMITS OF .002-in. are held on faces, .0005-in. on OD of intermediate shaft. 20 microinch finish maximum on both surfaces.

INTERMEDIATE SHAFT OD AND three-step face are ground in combination operation on this highly automated Cincinnati angled-wheel grinder with automatic "flag" table positioning unit that gages part for flange position before grinding begins, prevents wheel from ramming against workpiece in case of oversize flange. When grinding begins, automatic gage sizing caliper is positioned on OD, controls fast and slow infeed as well as sparkout dwell to bring piece automatically to size. Automatic cam-actuated single point diamond dresses wheel once every 25 pieces. Wheel used is 30 x 2⅜ x 20, A60 K5 V, run at 6500 sfm. Coolant is central system soluble.



CINCINNATI NO. 2 two-spindle chucking grinder with angled head does OD and facing job on intermediate support assembly. Headstock has twin chucks with rotary indexing between loading and grinding positions, permits virtually continuous grinding. One operator can handle 2 machines, checks parts with snap-type hand gage. A60 M9 V wheel is dressed once every 12 pieces by automatic dresser.

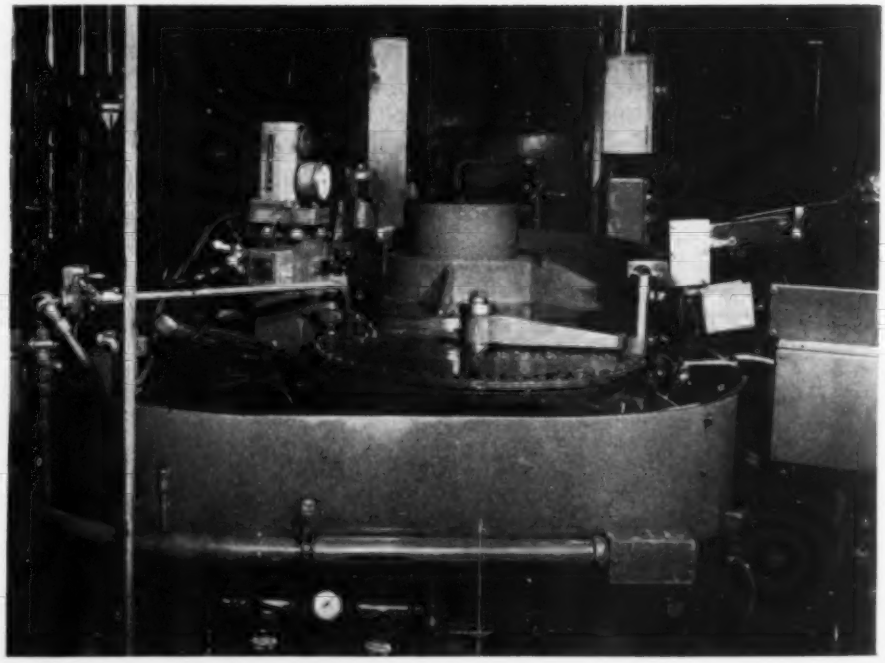


HEALD 72-A DUPLEX SIZEMATIC simultaneously rough and finish grinds ID's in either end of the Torque-Flite's reverse sun gear in approx. 40-second cycle. Part is loaded in air-operated 3-jaw chuck for stock removal totaling .008 - .010-in. in each bore. Sizematic cycle includes dressing of wheels once for each piece, between rough and finish portions of grind. Limits of .001-in. are held on both ID's, with finish of 20 microinches minimum and .010-in. maximum corner break.

CHRYSLER TORQUEFLITE

continued

MICROMATIC MODEL 836 flat honer finishes parallel surfaces of the planet pinion gear in automated pinion line at Chrysler Kokomo. Stock removal is about .0025-in., faces must be parallel and square with the bore within .001-in. TIR, and finish is 20 micro maximum. Automatic Sheffield air gaging unit is mounted for size control on a post-process basis, also sorting parts according to acceptability. Wheel is 6-segment C320 19 V.



MULTIWHEEL ROUGH GRINDING 3 diameters of the forged steel input shaft is handled by this 10 x 30 Landis H.I.W., working to limits of .001-in. on each of the diameters. 36 inch wheels used are A60 M* V, run at 6500 sfm. Dressing is necessary every 75 pieces. Operator uses snap gage to check part.

REGULATOR VALVES ARE ROUGH GROUND on this Van Norman I-C centerless after rough machining on automatics. A60 M5 V wheels are used on the mild steel valves, with central system coolant. Valves are held to .001-in. limits on this operation.

GARDNER DOUBLE-DISC GRINDER grinds both faces of the planet pinion gear just prior to the final honing operation described opposite. Rotary carrier takes parts through at prodigious rate of 1200 parts/hr. at 100%. Star-type dresser is used, but Chrysler reports that dressing is almost never required on this job. Wheel is an A120 JH10 B, coolant is soluble from the central system.

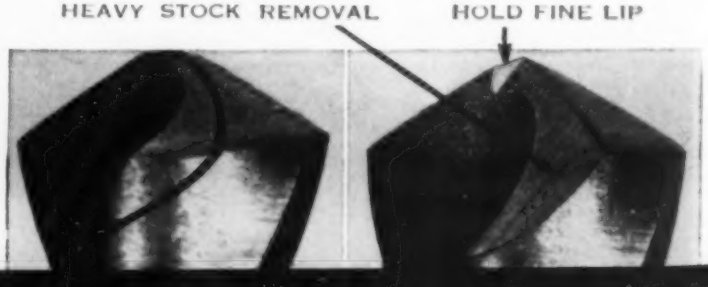
SHEFFIELD AUTOMATIC gear chamfering grinder with crush-formed wheel is used in automated pinion line to put a .020-.040-in. chamfer on gear tooth edges. Each gear engages teeth of rack as it passes through machine and contacts serrated-form wheel. Full automatic handling devices load and unload machine.

A GRINDING PROGRESS REPORT

Bay State Engineer Finds Way to Triple Production on Chisel Point Grinder

Grinding a "chisel point" on the business end of a twist drill makes it start faster and drill better in hard materials. It's more economical to grind each side of the "chisel" in one cut, as illustrated.

In practice, however, grinding wheels hard enough to hold their corner while cutting the sharp lip, burned the steel in the wide area near the land of the drill. Conversely, wheels soft enough for cool grinding on the land lost their corner rapidly in cutting the lip. In either case, frequent dressing of the wheel was necessary. Because of this, expensive overtime shifts were being worked in an attempt to meet production schedules. Even so, production lagged and rejections were high when Bay State was called in.



Bob Belmont, with 14 years abrasive engineering experience, quickly saw chisel-point grinding as two jobs in one.

Two jobs are done simultaneously with this wheel having two layers of different abrasives. Fine-hard side grinds the drill tip; coarser-softer side makes heavy cut on the land.

Bay State District Manager Bob Belmont saw this drill grinding problem as it really was . . . two distinctly different grinding tasks being done at the same time. To him, here was a natural spot for the "sandwich" wheel, really two wheels in one, with two different layers of abrasives, each having the exact specifications needed for its part of the job. The "specs" worked out for this actual case show the following important differences:

1. The side used for forming the sharp chisel lip has the highly refined 9A (White) Tool Grinding abrasive, a fine grit size (220), and a "hard" bond strength (P grade).

2. The side taking the deep cut on the broad area of the drill land has the less friable 8A abrasive, a relatively coarse grit size (150), and is two full letter grades "softer", (N grade).

With this sandwich wheel, chisel point production rose three times and even more, depending on drill size. In every case, this was more than enough to keep production going smoothly *without* overtime, and with excellent quality of points.

The job had been a production headache because of just one thing . . . it needed the trained abrasive engineering viewpoint to recognize the dual nature of the job . . . and make it work! This type of alert engineering can be skillfully applied to *your* grinding. Simply call in your local Bay State Distributor, or write directly to Bay State Abrasive Products Co., Westboro, Massachusetts.

Branch Offices are located in Bristol, Conn.; Chicago, Ill.; Cleveland, Ohio; Detroit, Mich.; Pittsburgh, Pa.; with distributors in all principal cities.

In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ont.

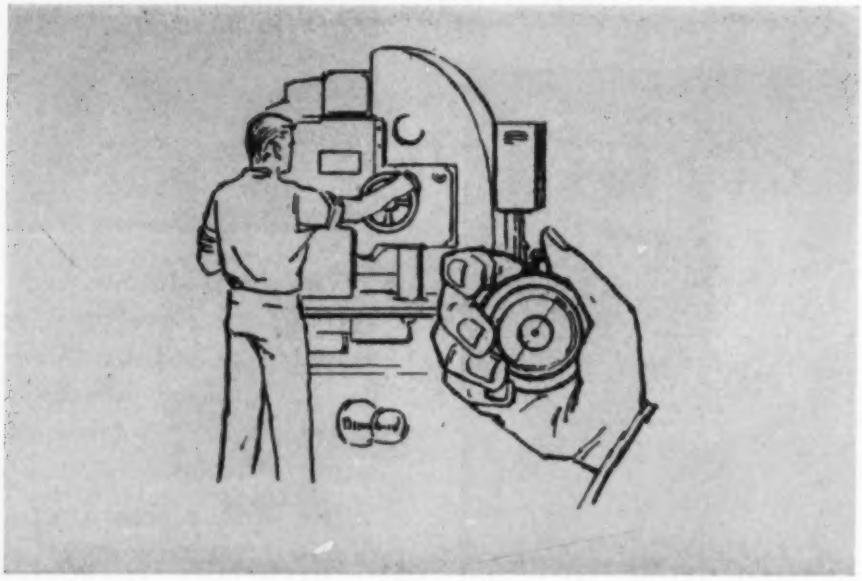
BAY STATE
WHEELS of PROGRESS

Use postpaid card. Circle No. 212

Developing

Standard Time Data

for Grinding Operations



Part 4

End Feed Centerless Grinding

by **E. A. Cyrol**
E. A. Cyrol & Company
Management Consultants

Fourth part of an authoritative series on standard time data for various classes of grinding. Mr. Cyrol has shown that grinding is highly suited to development of standard time data, which are powerful tools in production estimating work. Part 1 described in detail how standard data are developed. The steps can be outlined briefly as follows:

1. *Take a large number of time studies of the operation, carefully describing all the elements and recording their time values.*
2. *Post the time values to comparison sheets, where constant and variable elements of the operation can be quickly spotted.*
3. *Analyze the data for constant and variable elements. Look for possible methods improvements and incorporate them in the standard work cycle.*
4. *Perform a check study to determine the accuracy of values found in the analysis.*
5. *Write up the study in permanent form, including detailed element descriptions, tables of time values, and so on. Prepare a standard data work sheet for convenience in calculating production standards.*

Sample studies made by this method have been given in this article series, including Blanchard surface grinding, center-type cylindrical work (both plunge and oscillating), and this month's presentation on infeed centerless grinding.

● For our studies of infeed centerless operations, we had available Cincinnati No. 2, 3, and 4 centerless grinders. The data given on these pages apply to their operation, and can be regarded as a guide in establishing similar data in other plants. Some of the machines were equipped with auxiliary loading devices, ejectors and roller rests. We have confined our presentation to those devices in most general use, and to infeed type operations.

Element Description—Cincinnati No. 2 Centerless

1. **Pick Up Piece.** **Chart No. 19**
   This element includes the time allowed to pick up a piece from a work table or skid and move it to a proximity of the work rest blade.

2. **Position Piece in Machine.** **Chart No. 20**
   This element includes the time allowed to position a piece on the work rest blade; or on the work rest blade and roller support; between the grinding wheel and regulating wheel.

3. **Advance Regulating Wheel.** **.027 Min.**
   This element includes the time allowed to move the hand infeed lever down until the work touches the grinding wheel.

4. **Retract Regulating Wheel.** **.017 Min.**
   This element includes the time allowed to lift the hand infeed lever up to a full clear position.

5. **Remove Piece from Machine.**
   This element includes time allowed for the

No's. 2, 3 & 4 Cincinnati Centerless Grinders

Set Up:
Grinding Wheel Width 6-in
Regulating Wheel R.P.M.
Ejector Arbor No.
Weight 0.5#

Part No. AB1164 Oper. No. 110
Part Name Sleeve
Machine Type #2 CINCIN Dept. No. 781
Operation Description GRIND TO BL-2
O.D. Size 1.102 Length Tolerance .001

Table # 1

Table

Weight	Pick Up	Aside
0# - 1#	.033	.034
1.1# - 5#	.040	.034
5.1# - 10#	.045	.034

Skid

Weight	Pick Up	Aside
5.1# - 10#	.059	.041
10.1# - 20#	.073	.051
20.1# - 50#	.093	.068

Position & Remove # 3 & 4

Weight	Position	Remove
0 - 3#	.027	.027
3.1# - 4#	.030	.030
1# - 7#	.035	.035
1# -11#	.040	.040
11.1# -19#	.045	.045
19.1# -30#	.050	.050

Position & Remove # 2

Weight	Position	Remove
0 - 1#	.026	.036
1.1# - 2#	.040	.036
2.1# - 5#	.051	.036
5.1# -10#	.060	.036

Remarks:

Handling Elements	#2	#3	#4	Minutes
Pick Up Piece	Table #1			033
Position Piece in Machine	Table #1			026
Position Piece in Loader	.021			
Down Loader	.034			
Advance Regulating Wheel	.027	.034	.057	027
Retract Regulating Wheel	.017	.020	.033	017
Up Loader	.034			
Remove Piece from Machine	Table # 1			036
Remove Piece from Loader	.017			
Aside Piece Table Skid	Table # 1			034
Stop Coolant	.023	.023	.023	023
Stop Regulating Wheel	.025	.025	.025	
Up Splash Guard	.018	.018	.023	
Down Splash Guard	.023	.023	.023	
Start Regulating Wheel	.025	.025	.025	
Start Coolant	.030	.030	.030	030
Load & Unload Arbor				
Remove Piece When Using Roller	.010	-	-	
Load & Unload Pcs. to & from Skid	.046	.046	.046	046
Gauging Time 030 DONE DURING LAP				
.014 x 11 = .154				
Time Per .001 x No. of .001's Removed				154
Lap Out Time				090
Wheel Dress Allowance				040
Total Minutes Per Piece				556
Personal & Unavoidable 11.1 %				062
Total Production Time				618
Plus 20% Adjustment				124
Standard Minutes Per Piece				742
Standard Hrs. Per 100 Pieces				1 239
Pieces Per Hour				80.8

Computed By G. PHILLIPS Date 12-2-55
Checked By
Approved By
Previous Pieces Per Hr. 50
Previous Standard Hrs. 2.000
Date Entered 12-2-55 By

operator to remove piece from machine.
A. When roller support is used allow .010 Min.
B. When work rest blade is used allow .036 Min.
C. When ejector is used allow .017 Min.
(This element is done internal to retract of regulating wheel).

6. **Aside Piece** Graph No. IV
This element includes the time allowed to move a piece from the work rest blade area and place it on a work table or in a skid.

7. **Stop Coolant.** .023 Min.
This element includes the time allowed to shut off the coolant flow.

8. **Stop Regulating Wheel.** .025 Min.
This element includes the time allowed to press the stop button for the regulating wheel.

9. **Up Splash Guard.** .018 Min.
This element includes the time allowed to lift the front splash guard up to facilitate unloading.

10. **Down Splash Guard.** .023 Min.
This element includes the time allowed to move the front splash guard down before grinding.

11. **Start Regulating Wheel.** .025 Min.
This element includes the time allowed to press the start button for the regulating wheel.

12. **Start Coolant.** .030 Min.
This element includes the time allowed to start the coolant flow.

Diameter		Time Allowed Per .001	
Over	Thru	Type I	Type II
	.250	.005	.0025
.250	.500	.008	.005
.500	.750	.012	.007
.750	1.000	.021	.012
1.000	1.250	.025	.014
1.250	1.500	.029	.017
1.500	1.750	.035	.020
1.750	2.000	.041	.024
2.000	2.250	.047	.027
2.250	2.500	.051	.029
2.500	2.750	.059	.033
2.750	3.000	.063	.036
3.000	3.250	.067	.038
3.250	3.500	.071	.040
3.500	3.750	.075	.043
3.750	4.000	.084	.048

CHART NO. 13—TIME TO REMOVE .001-in. stock from diameter, Cincinnati No. 2 centerless. Select OD being ground in column headed "Diameter," read time value at right under "Time Allowed Per .001". TYPE I GRIND—used when grinding a diameter in one grind and have a total tolerance of less than .0005-in., or when grinding a thin-wall piece. TYPE II GRIND—used when operation is classed as rough grind or semi-finish grind, to be followed by finish grind, or when total tolerance on diameter is more than .0005-in.

Element Description—Cincinnati Nos. 3 and 4 Centerless

1. **Pick Up Piece.** Chart No. 19
This element includes the time allowed to pick up a piece from a work table or skid and move it to a proximity of the work rest blade or loader.

2. **Position Piece in Machine.** Chart No. 20
This element includes the time allowed to position a piece on the work rest blade, between the grinding wheel and regulating wheel.

3. **Position Piece on Loader.** .021 Min.
This element includes the time allowed to position a piece on loader arms. (This element is used only on special No. 3 Centerless).

4. **Down Loader.** .034 Min.
This element includes the time allowed for the operator to actuate the loader air control valve and for the loader to move down to the work blade. (This element is used only on special No. 3 Centerless).

5. **Advance Regulating Wheel.** Per Turn
No. 3 Centerless .034 Min.
No. 4 Centerless .057 Min.
This element includes the time allowed to turn the infeed hand wheel counterclockwise until the work touches the grinding wheel. When arbor is used or when piece is difficult to remove, allow multiple turns. To observers option for safety purpose.

Diameter		Lap Out Time In Minutes
Over	Thru	
	.250	.044
.250	.500	.058
.500	.750	.070
.750	1.000	.082
1.000	1.250	.090
1.250	1.500	.108
1.500	1.750	.120
1.750	2.000	.132
2.000	2.250	.144
2.250	2.500	.156
2.500	2.750	.168
2.750	3.000	.180
3.000	3.250	.192
3.250	3.500	.204
3.500	3.750	.216
3.750	4.000	.228
4.000	4.250	.241
4.250	4.500	.254
4.500	4.750	.266

CHART NO. 14—LAP OUT TIME, Cincinnati No. 2 centerless grinder. Select OD being ground in column headed "Diameter" and read time value at right under "Lap Out Time."

6. **Retract Regulating Wheel.** Per Turn
No. 3 Centerless .020 Min.
No. 4 Centerless .033 Min.

This element includes the time allowed to turn the infeed hand wheel clockwise until the work is clear of the grinding wheel. When arbor is used or when piece is difficult to remove, allow multiple turns. To observers option for safety purpose.

7. **Up Loader.** **.034 Min.**
This element includes the time allowed for the operator to actuate the loader air control valve and for the loader to slide up to the top loading position. (This element is used only on special No. 3 Centerless).

8. **Remove Piece from Machine.** **Chart No. 20**
This element includes the time allowed to remove the piece from the work rest blade.

9. **Remove Piece from Loader.** **.017 Min.**
This element includes the time allowed to remove a piece from the loader arms. (This element is used only on special No. 3 Centerless).

10. **Aside Piece.** **Chart No. 19**
This element includes the time allowed to move a piece from the work rest blade area or loader arm area and place it on a work table or in a skid.

11. **Stop Coolant.** **.023 Min.**
This element includes the time allowed to shut off the coolant flow.

12. **Stop Regulating Wheel.** **0.25 Min.**
This element includes the time allowed to press the stop button for the regulating wheel.

13. **Up Splash Guard.** **No. 3 Centerless .018 Min.**
No. 4 Centerless .023 Min.
This element includes the time allowed to lift the front splash guard up to facilitate unloading.

14. **Down Splash Guard.** **.023 Min.**
This element includes the time allowed to move the front splash guard down before grinding.

15. **Start Regulating Wheel.** **.025 Min.**
This element includes the time allowed to press the start button for the regulating wheel.

16. **Start Coolant.** **.030 Min.**
This element includes the time allowed to start the coolant flow.

17. **Cloth Splash Guard On and Off.** **.066 Min.**
This element includes the time allowed to position a cloth over the guard opening and to remove a cloth from the guard opening. This element not allowed unless requested by foreman.

Diameter		No. of Pieces Per Dress	Time Allowance Per Piece		
			Type I		Type II
Over	Thru		6" Width	1-1/2" Width	6" width
	.250	140	.032	.015	.018
.250	.500	100	.045	.021	.025
.500	.750	85	.053	.024	.029
.750	1.000	75	.060	.028	.033
1.000	1.250	62	.073	.033	.040
1.250	1.500	53	.085	.039	.047
1.500	1.750	48	.094	.043	.052
1.750	2.000	44	.102	.047	.056
2.000	2.250	41	.110	.050	.060
2.250	2.500	38	.118	.054	.065
2.500	2.750	36	.125	.058	.069
2.750	3.000	34	.132	.061	.073
3.000	3.250	32	.141	.065	.078
3.250	3.500	30	.150	.069	.083
3.500	3.750	27	.167	.077	.092
3.750	4.000	25	.180	.083	.099

CHART NO. 15—WHEEL DRESS ALLOWANCE, No. 2 Cincinnati centerless grinder. Select OD being ground in column marked "Diameter," read time value at right under "Time Allowed Per Piece." These values are based on following total dressing times: For 6" width wheel, Type I—4.50 Min., Type II—2.48 Min. For 1½ inch width wheels, Type I—2.07 Min. When removing .005-in. stock or less, use half the wheel dress allowance listed. When grinding more than one diameter, multiply number of diameters ground at one time by the allowance given in the chart.

Gaging

The gaging time values listed are based on the time allowed to check one dimension with gage listed.

Sheffield Gage

1. Under .0005 tol. solid piece — **Up to 2" Lgth.**
   Gage every pc. one position = .070 Min.
   Gage every 10th pc. (2) additional positions = .008 Min.
   2 x .04 = .080 ÷ 10 = .008
   .078 Min. Total
2. Under .0005 tol. solid piece — **Over 2" Lgth.**
   Gage every pc. one position = .070 Min.
   Gage every 10th pc. (4) additional positions = .016 Min.
   4 x .04 = .160 ÷ 10 = .016
   .086 Min. Total
3. Under .0005 tol. thin wall piece — **Up to 2" Lgth.**
   Gage every pc. one position = .070 Min.
   Gage every 5th pc. (2) additional positions = .016 Min.
   2 x .04 = .080 ÷ 5 = .016
   .086 Min. Total
4. Under .005 tol. thin wall piece — **Over 2" Lgth.**
   Gage every piece one position = .070 Min.
   Gage every 5th pc. (6) additional positions = .048 Min.
   6 x .04 = .240 ÷ 5 = .048
   .118 Min. Total
5. .0005 to .001 tol. — **Up to 2" Lgth.**
   Gage every 5th pc. one position = .014 Min.
   .07 ÷ 5 = .014
   Gage every 15th pc. (2) additional positions = .0053 Min.
   2 x .04 = .08 ÷ 15 = .0053
   .0193 Min. Total
6. .0005 to .001 tol. — **Over 2" Lgth.**
   Gage every 5th piece one position = .014 Min.
   .07 ÷ 5 = .014
   Gage every 10th pc. (4) additional positions = .016 Min.
   4 x .04 = .16 ÷ 10 = .016
   .030 Min. Total
7. .001 and over tol. — **.007 Min.**
   Gage every 10th pc. one position
   .07 ÷ 10 = .007
8. When using an arbor
   Use constant .118 Min.
   Plus one piece check .078 Min.
   .196 Min. Total

Concentricity Gage

1. Under .0005 tol. — **.016 Min.**
   Gage every 5th piece
   .082 ÷ 5 = .016 Min.
2. .0005 to .001 tol. — **.008 Min.**
   Gage every 10th piece
   .082 ÷ 10 = .0082 Min.

Micrometer

1. Under .0005 tol. — **.210 Min.**
   Gage every piece
   Each additional position **.080 Min.**
2. .0005 to .001 tol.
   Gage every 5th piece
3. .001 and over tol.
   Gage every 10th piece

Diameter		Time Allowed Per .001		Diameter		Time Allowed Per .001	
Over	Thru	Type I	Type II	Over	Thru	Type I	Type II
	.750	.0095	.0054	5.000	5.250	.0661	.0378
.750	1.000	.0126	.0072	5.250	5.500	.0690	.0395
1.000	1.250	.0158	.0091	5.500	5.750	.0724	.0414
1.250	1.500	.0188	.0108	5.750	6.000	.0754	.0431
1.500	1.750	.0229	.0131	6.000	6.250	.0786	.0449
1.750	2.000	.0251	.0144	6.250	6.500	.0817	.0467
2.000	2.250	.0292	.0167	6.500	6.750	.0850	.0486
2.250	2.500	.0315	.0180	6.750	7.000	.0880	.0503
2.500	2.750	.0347	.0198	7.000	7.250	.0912	.0521
2.750	3.000	.0377	.0215	7.250	7.500	.0942	.0539
3.000	3.250	.0410	.0234	7.500	7.750	.0975	.0557
3.250	3.500	.0440	.0251	7.750	8.000	.1006	.0575
3.500	3.750	.0473	.0270	8.000	8.250	.1038	.0593
3.750	4.000	.0502	.0287	8.250	8.500	.1068	.0610
4.000	4.250	.0535	.0306	8.500	8.750	.1131	.0646
4.250	4.500	.0565	.0323	8.750	9.250	.1157	.0661
4.500	4.750	.0598	.0342	9.250	9.500	.1182	.0675
4.750	5.000	.0628	.0354	9.500	9.750	.1206	.0689
				9.750	10.000	.1256	.0718

CHART NO. 16—TIME TO REMOVE .001-inch stock from diameter, Nos. 3 and 4 Cincinnati centerless grinders. Select OD being ground, read time value at right. Use Type I grind when (a) grinding a diameter in one grind and have a total tolerance less than .001-inch, (b) print calls for microfinish lower than 32, or (c) grinding thin walled piece. Use Type II grind (a) when operation is classed as rough or semi-finish grind to be followed by finish grind, (b) when diameter has a total tolerance greater than .001-inch.

Personal & Unavoidable Delay

The following allowances are to be added to the cycle or floor time of operations. The unavoidable delay allowance was determined from eight hour delay time studies. The personal time allowed is shown below. The total is expressed as a percentage of the work day. It is determined by adding the total delay minutes allowed and subtracting from 480.00 minutes. The total minutes allowed is then divided by the remainder for the percentage figure.

Personal: **33.00 Min.**

The personal time allowed is as follows:

1. End of shift wash up.....	7.00 Min.
2. Two coffee periods (5.00 Mins. each)	10.00 Min.
3. Personal	16.00 Min.
	33.00 Mins. Total

Unavoidable Delay: **15.00 Min.**

These delays occur throughout the day and consist of receiving instructions from the foreman, group leader, or setup man, interference from or assistance to truckers and material handlers, adding skid sections and cardboard separators, trips to the inspection bench, adding coolant to the machine and work area, mark time card and tools out and away.

Percentage allowance:

Personal	33.00 Min.
Unavoidable	15.00 Min.
	48.00 Min.

$$\frac{48.00}{480.0 - 48.00} = 11.1\% \text{ Allowance.}$$

Explanation of Work Sheet— Centerless End Feed Grinding

A standard is calculated on the following pages through the use of the Standard Data Work Sheet. The example is intended to serve as a guide to the prescribed method of determining a production standard with the Standard Data described in the preceding pages of this write-up.

The Standard Data Work Sheet must be carefully filled out with all pertinent information regarding the operation. The work sheet is filed for future reference after the standard has been calculated and transferred to the shop routings and payroll records.

In the event a standard is challenged, the work sheet, along with all necessary pertinent and supporting data, is generally the basis of any investigation of the standard.

When additional elements not included on the work sheet are found to be necessary, a time study should be taken to obtain this information. This additional element should be recorded in the write-up for future reference and development of data for this element.

Check files for print of part number concerned. Refer to previous B.L.'s for dimensions held on preceding operations. The routing will also be needed for other pertinent information.

CHART NO. 17 — LAP OUT TIME, Nos. 3 and 4 Cincinnati centerless grinders. Select OD being ground, read time value at right.

Diameter		Lap Out Time In Minutes	Diameter		Lap Out Time In Minutes
Over	Thru		Over	Thru	
	.250	.044	5.250	5.500	.302
.250	.500	.058	5.500	5.750	.314
.500	.750	.070	5.750	6.000	.326
.750	1.000	.082	6.000	6.250	.340
1.000	1.250	.090	6.250	6.500	.352
1.250	1.500	.108	6.500	6.750	.364
1.500	1.750	.120	6.750	7.000	.376
1.750	2.000	.132	7.000	7.250	.388
2.000	2.250	.144	7.250	7.500	.400
2.250	2.500	.156	7.500	7.750	.412
2.500	2.750	.168	7.750	8.000	.424
2.750	3.000	.180	8.000	8.250	.436
3.000	3.250	.192	8.250	8.500	.448
3.250	3.500	.204	8.500	8.750	.460
3.500	3.750	.216	8.750	9.000	.472
3.750	4.000	.228	9.000	9.250	.484
4.000	4.250	.241	9.250	9.500	.496
4.250	4.750	.254	9.500	9.750	.508
4.500	4.750	.266	9.750	10.000	.520
4.750	5.000	.278			
5.000	5.250	.290			

1. Fill in upper right hand corner of work sheet with Part No., Oper. No., Part Name, Machine Type, Machine No., Dept. No., Operation Description, O.D. Size, Length and Tolerance.

2. Transcribe time values for handling and machine elements, listed under type of machine used, to right hand column. Refer to Table No. 1 for time values for "Pick Up," "Aside," "Position" and "Remove." If the routing calls for a special fixture or arbor to be used, a clocked cycle will have to be taken and that time value noted on work sheet.

   If an automatic loader is to be used, the values for "Position Piece in Machine" and "Remove Piece from Machine" are not used. If an automatic loader is not used, the values for "Position Piece in Loader," "Down Loader," "Up Loader" and "Remove Piece from Loader" are not used. The time values "Stop Coolant," "Stop Regulating Wheel," "Up Splash Guard," "Down Splash Guard," "Start Regulating Wheel" and "Start Coolant" are allowed for all jobs running on No. 4 Cinn. and for grinding over 3" diameters on No. 3 Cinn., and for all arbor jobs. These values are allowed on the No. 2 Cinn. only on request of the foreman.

3. Allow "Load and Unload Pc. to and from Table" value if needed. This value is usually allowed only for pieces weighing 5 lbs. or less.

4. Fill in and compute "Grinding Time" formula. Refer to Chart No. 13 for No. 2 Centerless and Chart No. 16 for No. 3 and No. 4 Centerless for time values "Time to Remove .001 Stock." Add the TIR allowance held on previous operation to amount of stock being removed. Transcribe grinding time to right hand column. These values will also be found on back side of work sheet.

Diameter		No. of Pieces Per Dress	Time Allowance Per Piece		
			Type I		Type II
Over	Thru		6" Width	2 Dia. Wheels	6"Width
	.250	140	.032	,035	.018
.250	.500	100	.045	.050	.025
.500	.750	85	.053	.059	.029
.750	1.000	75	.060	.067	.033
1.000	1.250	62	.073	.081	.040
1.250	1.500	53	.085	.094	.047
1.500	1.750	48	.094	.104	.052
1.750	2.000	44	.102	.114	.056
2.000	2.250	41	.110	.122	.060
2.250	2.500	38	.118	.132	.065
2.500	2.750	36	.125	.140	.069
2.750	3.000	34	.132	.147	.073
3.000	3.250	32	.141	.156	.078
3.250	3.500	30	.150	.167	.083
3.500	3.750	27	.167	.185	.092
3.750	4.000	25	.180	.200	.099
4.000	4.250	24	.188		.103
4.250	4.500	22	.205		.113
4.500	4.750	20	.225		.124
4.750	5.000	19	.237		.131
5.000	5.250	18	.250		.138
5.250	5.500	17	.265		.146
5.500	6.000	14	.321		.177
6.000	6.500	12	.375		.207
6.500	7.000	11	.409		.225
7.000	7.500	10	.450		.248
7.500	8.500	9	.500		.276
8.500	9.000	8	.563		.310
9.000	10.000	7	.643		

CHART NO. 18—WHEEL DRESS ALLOWANCE—Nos. 3 and 4 Cincinnati centerless grinders. When removing .005 stock or less, use half the wheel dress allowance listed for "6 in. width Type I", "6 in. width Type II," and "2 Dia. Wheels." Select diameter being ground, read time value at right under "Time Allowed Per Piece." Dressing times used to obtain these values: 6" width wheels, Type I—4.50 Min., Type II—2.48 Min. 2-Diameter Wheels, 10 Min.

Table		
Weight	Pick Up	Aside
o# - 1#	.033	.034
1.1# - 5#	.040	.034
5.1# - 10#	.045	.034
Skid		
Weight	Pick Up	Aside
5.1# - 10#	.059	.041
10.1# - 20#	.073	.051
20.1# - 50#	.093	.068

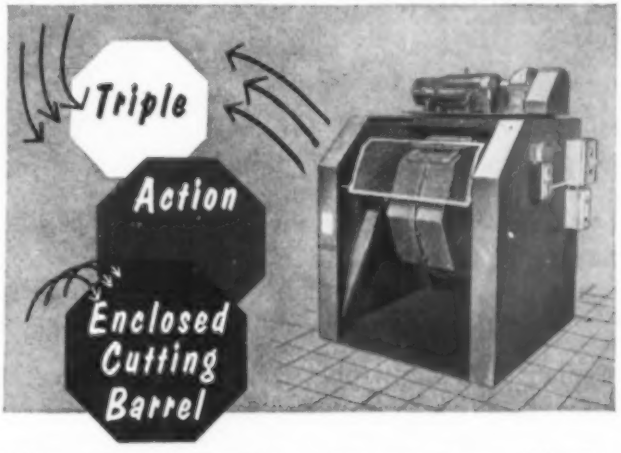
CHART NO. 19—PICK UP AND ASIDE PIECE.

5. Fill in "Lap Time" value. Refer to Chart No. 14 for No. 2 Centerless and Chart No. 17 for No. 3 and No. 4 Centerless. These values will also be found on back side of work sheet. When lapping is lower than gauging time this element is then internal to gauging.
6. Fill in the "Wheel Dress Allowance." Refer to Chart No. 15 for No. 2 Centerless and Chart No. 18 for No. 3 and No. 4 Centerless.
7. Write in any other information needed, under "Remarks."
8. Add up right hand column and enter total on "Total Minutes Per Piece" line.
9. Multiply above by 11.1% and enter answer on "Personal and Unavoidable" line.
10. Add items 8 and 9 and enter total on "Total Production Time" line.
11. Multiply above by 20% and enter answer on "Plus 20% Adjustment" line.
12. Add items 10 and 11 and enter total on "Standard Minutes Per Pc." line.
13. Divide above total by .6 and enter answer on "Standard Hrs. Per 100 Pcs." line.
14. Divide the number 100 by item 13 and enter answer on "Pieces Per Hr." line.
15. Fill in the upper left hand corner of work sheet with "Grinding Wheel No.," "Width," "Regulating Wheel RPM" if needed, check "Ejector" if used and enter "Arbor No." if needed.
16. Fill in the lower left hand corner of work sheet, items, "Computed By," "Date," "Previous Pieces Per Hr." and "Previous Standard Hrs."
17. Have standard checked by department supervisor and signed by foreman concerned.
18. Make out change slip and stamp with "Date Entered" and initial.
19. File standard for future reference.

Position & Remove #3 & #4		
Weight	Position	Remove
o# - 3#	.027	.027
3.1# - 4#	.030	.030
4.1# - 7#	.035	.035
7.1# - 11#	.040	.040
11.1# - 19#	.045	.045
19.1# - 30#	.050	.050
Position & Remove #2		
o# - 1#	.026	.036
1.1# - 2#	.040	.036
2.1# - 5#	.051	.036
5.1# - 10#	.060	.036

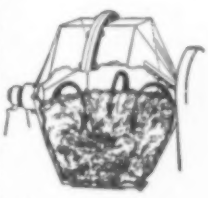
CHART NO. 20—POSITION AND REMOVE PIECE, No. 2, 3 and 4 Cincinnati centerless grinders.

*End of Part 4. Next month the author concludes the series with Part 5, dealing with center lapping. Because of heavy response to this series, our supply of tear sheets of previous parts has been exhausted. Watch for an announcement regarding reprints, which should be available in March.



The Finest Cutting Barrel Ever Made

Hartford's great new enclosed barrel speeds deburring, descaling, polishing on screw machine parts, stampings, and castings. Hartford's unique *Triple Cutting Action* produces the highest degree of uniformity . . . faster . . . at lower cost. Extremely compact with every modern feature for efficiency, safety, and cleanliness. Available in 4 and 10 cu. ft. barrel capacities. Write for complete literature.



Hartford

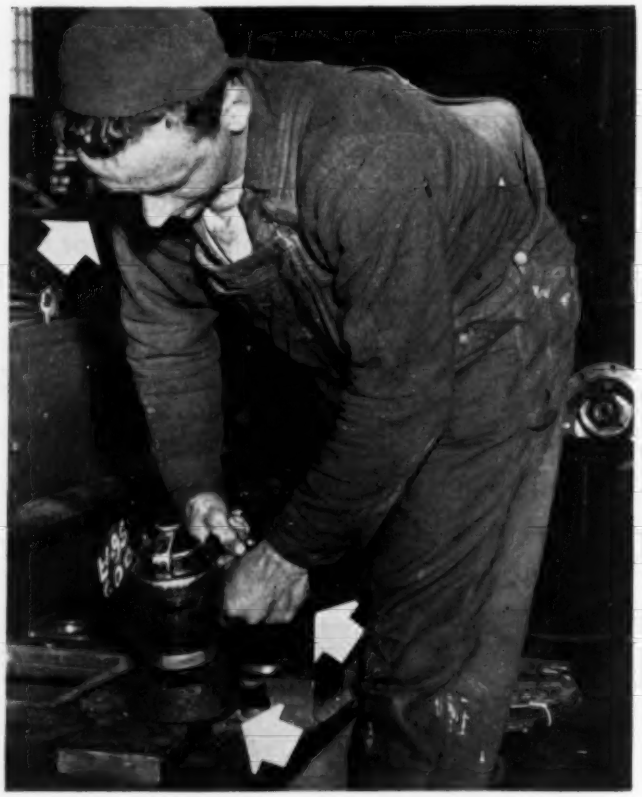
PRECISION BALLS • RETAINERS
BEARINGS • TUMBLING BARRELS

Hartford Steel Ball Co., Inc., 21 Jefferson, W. Hartford 6, Conn.
Use postpaid card. Circle No. 213

GRINDING safely

by **Edmund Mottershead,** President
Mottershead Associates, Chicago

WRONG . . .
Eager Beaver goes at his grinding in a hurry. No goggles, no hand protection on relatively rough work, and no guard on his machine. If that wheel is cracked, he is in trouble!



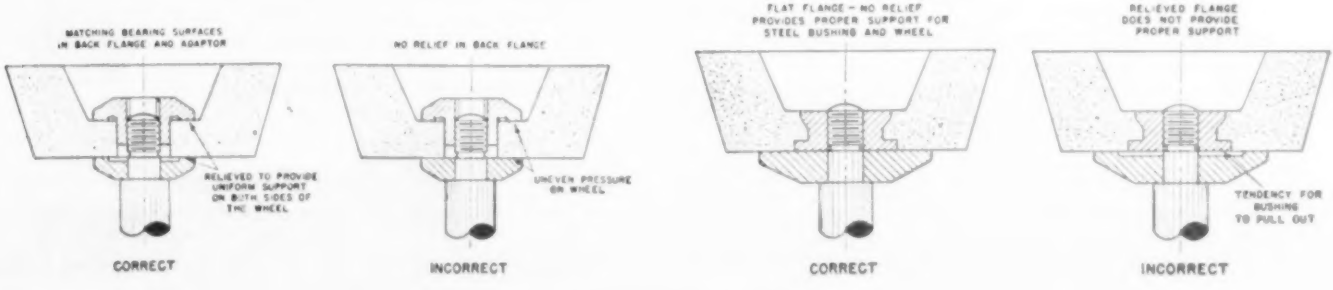
RIGHT . . .
The popular song says: "Just five minutes more . . ." But it only takes a moment longer to get the gloves, the face shield, and make sure there is a proper guard on the machine.

● The real hazard in grinding comes from wheel breakage. One prime cause of wheel breakage is improper wheel mounting, with stresses unrelieved or with inadequate support for the wheel.

Flanges of the wrong size, that are not matched in size, or that are distorted and cause uneven pressure on the sides of the wheel, will tend to create conditions leading to breakage.

Omitting the outer flange, substituting a large washer for the flange, reversing the outer flange and otherwise mounting the wheel in such a way that stresses are set up internally will create hazardous operating conditions.

The most common type of portable grinders use wheels with threaded steel bushings which are molded in and become part of the wheel itself. Such wheels are simply screwed onto the end of the spindle. It is recommended that the flange used be flat and unrelieved, as relieved flanges tend to make the bushing pull out of the wheel as it is tightened down. • • •


MATCHING BEARING SURFACES IN BACK FLANGE AND ADAPTOR
RELIEVED TO PROVIDE UNIFORM SUPPORT ON BOTH SIDES OF THE WHEEL
CORRECT
NO RELIEF IN BACK FLANGE
UNEVEN PRESSURE ON WHEEL
INCORRECT
FLAT FLANGE – NO RELIEF PROVIDES PROPER SUPPORT FOR STEEL BUSHING AND WHEEL
CORRECT
RELIEVED FLANGE DOES NOT PROVIDE PROPER SUPPORT
TENDENCY FOR BUSHING TO PULL OUT
INCORRECT

. . . "*Positive Duplication—offered* ONLY *by* CINCINNATI (PD)° GRINDING WHEELS—*is a remarkable achievement in precision manufacturing and quality control!*"

And no wonder everybody's shouting the praises of CINCINNATI (PD) WHEELS. *You can save money . . . and increase your production . . .* when (PD) WHEELS are on the job. For through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

For complete details, see your CINCINNATI (PD) Grinding Wheels distributor, or contact us direct. We'll be happy to send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Telephone (or wire or write) Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you . . . (PD) POSITIVE DUPLICATION

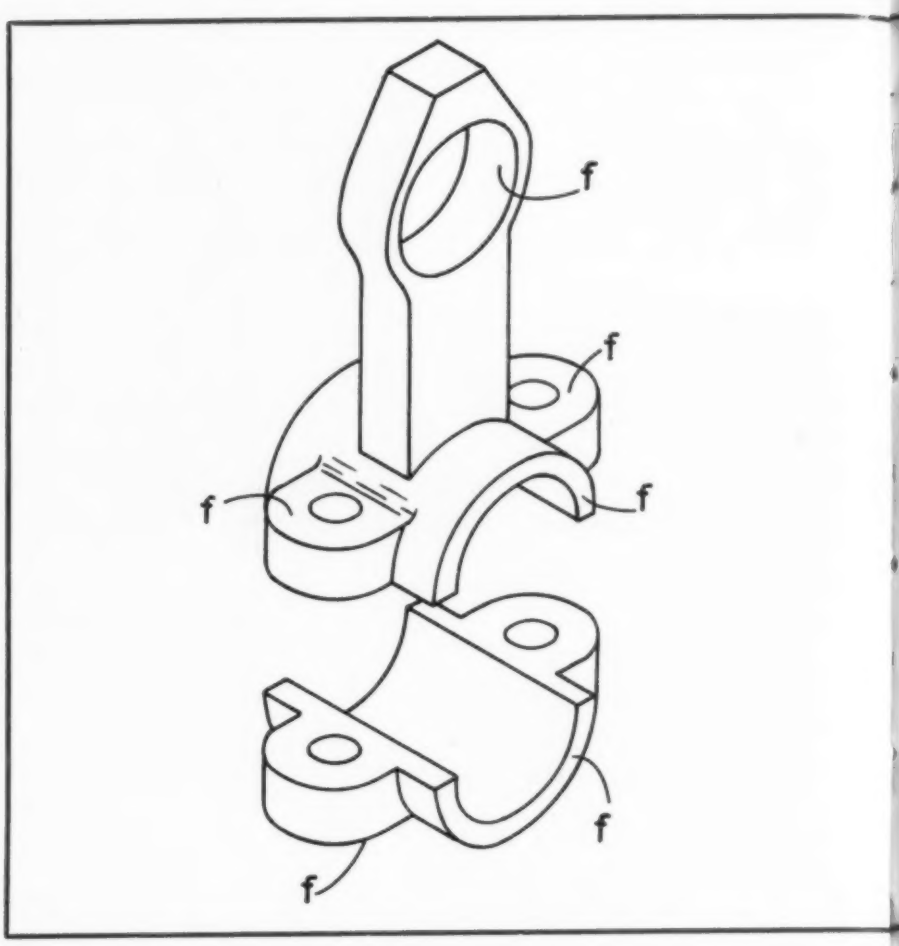
CINCINNATI®
Grinding Wheels
A PRODUCTION-PROVED PRODUCT OF
THE CINCINNATI MILLING MACHINE CO.

°Trade Mark Reg. U. S. Pat. Off.

Use postpaid card. Circle No. 214

Problem:

To find a method for clamping the connecting rod at right in a fixture on a surface grinder. In order to speed production, a method for holding 12 separate rods at one time, with a minimum of effort required for clamping was desired.



Multiple Clamping with a Roller Chain

by **Clifford T. Bower**

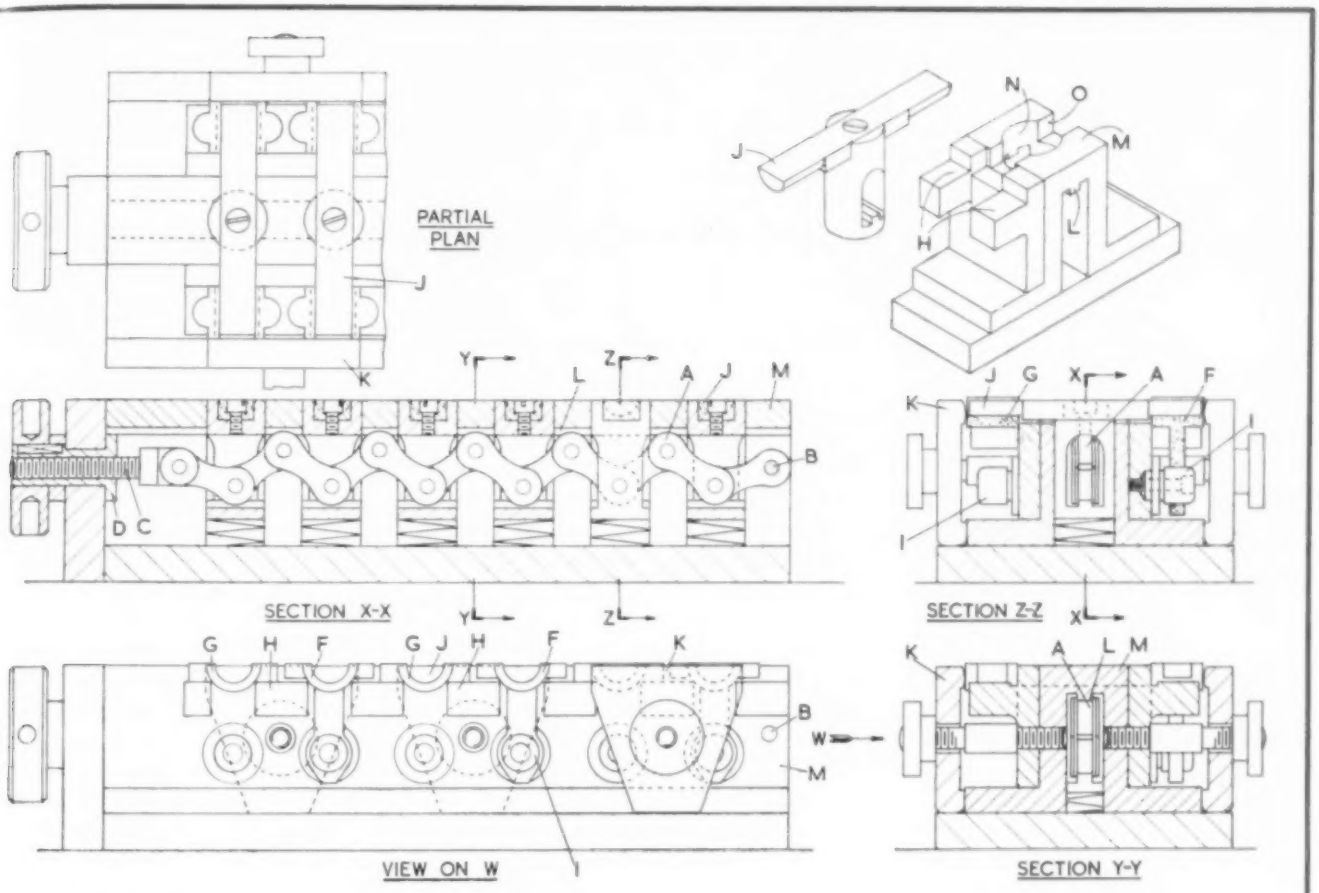
Solution:

● The main interest in this multiple clamping fixture for surface grinding is the use of a standard 1 in. pitch roller chain as a multiple clamping device. The chain is at A in the longitudinal Section X-X and is anchored immovably at the end B by means of a pin. The other end is arranged to be traversed horizontally by means of the screw C which is engaged with the revolving nut D. The nut is rotated by means of the knob at the left hand end of the fixture.

The nut has a shoulder and when rotated it tends to push the extreme ends of the roller chain together, thus shortening its length. The vertical distance between the upper and lower rollers in the chain is increased as the length is shortened so that a strong vertical or wedging action takes place between the upper and lower row of rollers. Since the rollers are flexibly mounted on their swivelling chain links, the distance vertically between any upper and adjacent lower roller can be variable or different to that of the pair of rollers near to it. This is a very valuable feature of this type of clamping device which has been used successfully on milling fixtures. Another advantage of the method is that all the components in a fixture can be clamped with one movement of a rotating nut or screw; in the example illustrated, twelve separate items are clamped with one motion of the knob on the nut D.

The component for which the fixture is designed is illustrated above in color and can be seen to comprise a special type of connecting rod used for the compressor of a refrigerator unit. The piece is machined on the surfaces marked "f" and is to be ground on the joint faces of the two bearing halves. The exterior flat surfaces of the bolting lugs are used as locations in one direction and the end faces of the bearings used as locations in the other direction. The small end of the connecting rod is finish-bored and can be used as a location.

The fixture is arranged to take six complete connecting rod assemblies. The connecting rods and



caps may be placed separately on any part of the fixture. This feature is shown in the side view on W in Fig. 1. The upper part of the connecting rod is shown at F and its attendant cap is shown at G. All the caps can be placed on one side of the fixture or they can be mixed indiscriminately with connecting rod halves. This comes about because the bolt lugs on the two halves are of unequal thickness. The cap G rests on the horizontal locating faces H on the fixture and the connecting rod small end bore engages with the button I, so that its bolt lug surfaces are clear of the surface H.

The connecting rod portion must be held upright during grinding and the cap pieces must be clamped firmly on to the locating surfaces H. This is accomplished by means of the rods J which are of rectangular action and machined to form a semi-circle at each end; the semi-circular portions engage with the bearing surfaces of the two parts of the connecting rod. Caps G are pushed down into contact with the horizontal locating surfaces H on the fixture and the connecting rod parts are held vertically and clamped in a downward direction by the semi-circular ends. The pieces are clamped in a horizontal direction by the clamp plates K and their thumb nuts.

In a former version of this fixture, the 6 clamping rods J had to be tightened individually by the operator while he was loading; in the present version, all the rods J are pulled firmly downward with one turn of the knob at the left hand and by means of the chain device.

As can be seen in the isometric drawing of a clamping rod J and its attendant plunger, the lower rollers of the chain bear on the tongued surface of a slot passing through the plunger. The upper rollers of the chain press on a similar tongue L machined in the upper part of the fixture body M. From the pictorial view of a section of the fixture body, it can be seen that each plunger carrying a horizontal clamping rod at its upper end slides freely in the bore of a vertical hole N; there are six of these holes and they intersect the slot milled through the full length of the fixture body for housing the chain.

The plungers are a free fit in the holes in the body so that they can tip sideways slightly to accommodate irregularities in the heights of the components. The vertical sides of the clamping rods J are a close fit in the slots O milled transversely for them across the fixture body; this ensures that the center lines of the clamping rods are always at a right angle to the longitudinal center line of the fixture body and thus hold the connecting rod part of the components vertically.

When end pressure on the chain is released by slacking back the nut, each plunger is pushed upward by means of a short compression spring placed at the bottom of each plunger hole so that loading of the component is eased considerably by raising the clamping rods. Vertical travel of the plungers need not exceed 1/16 in.

• • •

Business Decisions That Affect Your Tax Return

This article is based on information supplied by the American Institute of Accountants, the national professional organization of certified public accountants, and checked for technical accuracy by the Internal Revenue Service.

● Long-range tax planning in today's business world of high tax rates is no longer "big business foolishness". Last-minute tax worrying with no year-round tax thinking can result in the loss of sizeable savings for small and medium-sized businesses when it comes time to file a tax return.

For example, assume that last summer you were forced to replace your air conditioner. You shopped around and found you could either sell your old unit to a private party for $500, or a dealer in town would give you a trade-in allowance of $500 on it. That seemed like six-of-one-half-a-dozen-of-another to you; so without thinking—or worrying—about tax matters you traded in the old air conditioner.

To prove how such a seemingly simple business decision such as this can affect how much tax you will have to pay, let's assume further that the air conditioner which you traded had originally cost $2500 and that you had taken $1000 in depreciation on it. This meant its cost for tax purposes was $1500, and you were going to "lose" $1000 whether you accepted the dealer's trade-in allowance of $500 or sold to the private party for $500.

So far still six-of-one-half-a-dozen-of-another, but now since you elected to trade-in your old air conditioner, let's see how you can claim a deduction on a tax return for your $1000 loss. The answer is simple. You can't. All you can do is add the amount of the loss to the cost of your new unit, and eventually receive tax credit for your

it's the SHAPE that counts!

ALL NEW... Speed-D-Burretts*
Controlled Size and Shape
ABRASIVE MEDIA for PRECISION BARREL FINISHING

Outlasts other media as much as 10 to 1
Controlled grain size Aluminum Oxide bonded firmly with specially formulated synthetic rubber to allow finishing of precision parts hitherto impossible to barrel finish. Molded and cured to controlled hardness that assures long life, maximum cushioning yet gives desired cutting, honing or polishing action. May be used with any equipment.
New "Burretts" permit abrasive action in the most remote corners and recesses of delicate, precision parts. Will not chip or splinter into odd shapes that lodge in blind or threaded holes. Prevents broken chip damage to expensive parts.
Write for catalog of prices, sizes, shapes and grits—today!

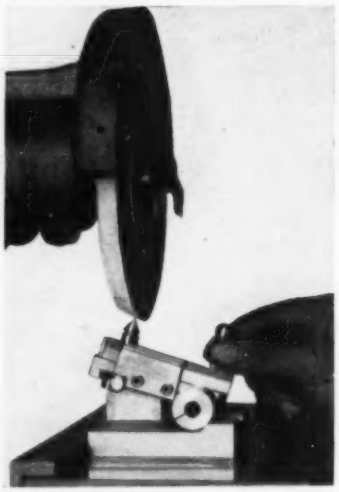
*Pat. Pend.

SPEED-D-BURR CORPORATION
PRECISION BARREL FINISHING
THE WORLD'S MOST COMPLETE LINE OF

Write for catalogs on:
FUTURAMA LINE • MITY-MITE LINE • SPACE-MISER
MEDIA AND COMPOUNDS • HANDLING EQUIPMENT
Service is our most important product... Use it!

SPEED-D-BURR CORPORATION
3613-e San Fernando Road, Glendale 4, Calif.

Use postpaid card. Circle No. 215



for precision ground ANGLES the *Sine* ANGLE wheel dresser is the answer . . .

The principle of the Sine Bar is utilized to insure extreme accuracy in dressing a grinding wheel to any desired angle.

Setting the tool and dressing the wheel takes only a few minutes and the necessity for complicated angular set ups is practically eliminated.

This fine but moderately priced tool is PRECISION made but sturdy enough to give many years of satisfactory service and will pay for itself in a short time.

Ask us for literature

AMERICAN STANDARD CO.
DEPARTMENT G PLANTSVILLE, CONN.

Use postpaid card. Circle No. 216

CHICAGO

mounted wheels

are America's finest

Chicago Wheels are available in all standard sizes and over 200 special shapes. This wide selection of these tough, fast cutting Chicago Mounted Wheels makes it possible for you to choose just exactly the right mounted wheel for your job. And delivery of most Chicago Mounted Wheels is prompt . . . right out of stock.

TRY CHICAGO MOUNTED WHEELS TODAY

Let us send you two samples of these true-running uniform Chicago Mounted Wheels. Try them at no cost to you. Send coupon below.

WHEN YOU THINK OF MOUNTED WHEELS SPECIFY . . . CHICAGO!

CHICAGO MOUNTED WHEELS are manufactured under positive density control to insure peak job performance.

GUARANTEED to stay on their mandrels, they are perfectly balanced, easily dressed, and hold their shape.

SAVE TIME, MONEY, MATERIALS . . . any number of combinations of dimension, shape, grain size and bond.

Chicago Wheel and Mfg. Co.

1101 W. Monroe Street, Chicago 7, Illinois

SEND ME SAMPLE CHICAGO MOUNTED WHEELS

Name .....

Firm Name .....

Street Address .....

City ..... Zone ..... State .....

Use postpaid card. Circle No. 217

loss in the form of slightly higher depreciation deductions.

On the other hand, if you had made a bona fide sale of your old unit to the private party and a separate purchase of a new unit from a dealer, you would have established a $1000 loss which could be claimed as a loss deduction on a tax return and used to offset regular income.

It is not always true, of course, that a loss deduction on the tax return is worth two in the bush of depreciation, but a general rule to consider when you are trying to decide whether it would be more advantageous taxwise for you to sell or trade-in an asset is: sell "loss" property to obtain a deduction, and trade "profit" property to avoid the tax which must be paid on any profit realized from the sale of an asset.

You may find that you have sold yourself into a capital gains tax or traded yourself out of a loss deduction if you have not figured your depreciated costs correctly. This is a matter you should discuss with a certified public accountant. Not only can he verify the accuracy of your mathematical computations, but he can also explain the advantages and disadvantages of the various methods used to compute depreciation. It could be that the method you used or are using is not the one most suited to your business needs from a tax standpoint.

For example, if you asked a CPA whether you should use the straight-line or declining balance method to depreciate your new air conditioner, one of the first questions he might ask you would be: what are your cash requirements and what are your profits likely to be? If you are thinking of expanding and need additional cash within the next few years, he might recommend that you use the "new" declining balance method to compute depreciation.

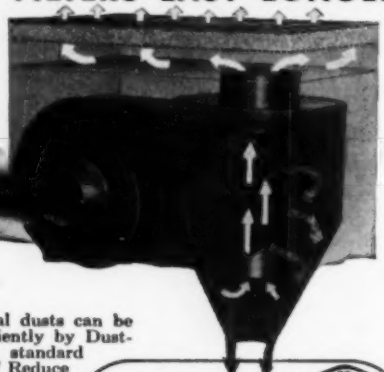
The declining balance method "speeds up" or increases depreciation rates. This starts the chain reaction to your objective of retaining cash in the business, because when you increase depreciation rates you also increase allowable depreciation deductions on your tax return. The amount you may write-off the first year is twice what it would be if you used the straight-line method; so by applying a $1000 instead of $500 depreciation deduction against your regular income, you are going to reduce your taxes, and cash that does not have to be paid out in federal taxes can be retained in the business for expansion purposes.

It seems all good things eventually come to an end, however, and while in the first year the declining balance depreciation rate may be double that of the straight-line, this differential diminishes in succeeding years until declining balance deductions are even less than they would be under the straight-line method. This is why it is important that you consider current and future earnings before you select a depreciation method.

For example, if your current earnings are low, or if you are putting in a new line of merchandise and the results of this expansion

CYCLONE SEPARATION

FOR MORE EFFICIENT DUST COLLECTION —FILTERS LAST LONGER



Almost all industrial dusts can be collected more efficiently by Dustkop. Thirty-seven standard models *ready to use!* Reduce installation costs — save space. Write for descriptive literature.

DUSTKOP STOPS DUST

ALSO A COMPLETE LINE OF MIST COLLECTORS

AGET MANUFACTURING COMPANY
1200 EAST CHURCH ST., ADRIAN, MICH.

Use postpaid card. Circle No. 218

for Super-Finishing of HARDENED STEEL CERAMICS CARBIDE STELLITE

SUPER-LAP
DIAMOND COMPOUND

Now you can get high-luster, micro-finishes in less time . . . at less cost. Acme Super-Lap is pure diamond, accurately graded and uniformly suspended in a quality, water soluble vehicle that adheres to the work surface. Applicator simplifies use, operates with one hand.

Write for Free Price Bulletin

Acme Scientific Company

1468 W. RANDOLPH ST. • CHICAGO 7, ILLINOIS
MONROE 6-1834
World's Leading Mold Polishers

Use postpaid card. Circle No. 219

X TO ALL FOUNDRIES

GOOD NEWS! EXCITING NEWS! PROFITABLE NEWS!

"X" TYPE FOUNDRY WHEELS

"X" TYPE FOR PORTABLES

"X" TYPE FOR SWINGS

"X" TYPE FOR STANDS

We've broken the "X" barrier. The factor of "X" is no longer a challenging mystery. After a long period of experimentation, followed by extensive pilot plant and field testing, Precision has ready for you—THE USER—a sensational new resinoid wheel for FOUNDRY GRINDING. It has proved its superiority in every way on all types of high speed FOUNDRY SNAGGING:

ON—Swing Frame Grinders!

ON—Floor Stand Grinders!

ON—Portable Grinders using Straight Wheels!

ON—Portable Grinders using Cup Wheels!

ON—Portable Grinders using Cones!

"X" TYPE IS NEW! "X" TYPE IS DIFFERENT! "X" TYPE IS REVOLUTIONARY!

If you want to increase wheel life and maintain cut rate: "X" TYPE does it! If you want to increase cut rate and maintain wheel life: "X" TYPE does it!

And "X" TYPE DOES IT IMPRESSIVELY! Not by just a few per cent but by 25% or more.

No matter what wheels you have been buying for your high speed FOUNDRY SNAGGING; no matter what the purchase price, you owe it to yourself to TRY—then BUY "X" TYPE wheels!

REMEMBER!

"X" TYPE resinoid wheels for high speed FOUNDRY GRINDING are exclusive with PRECISION GRINDING WHEEL COMPANY

Send for our brochure "X" TYPE FOUNDRY WHEELS

PRECISION

GRINDING WHEEL COMPANY

PHILADELPHIA 36, PENNSYLVANIA

Use postpaid card. Circle No. 220

will take a few years to show in your earnings, it might be more advantageous taxwise for you to use the straight-line method of computating depreciation.

The straight-line method does not "speed up" depreciation deductions. It spreads them out equally over the estimated useful life of the asset; so when you use a straight-line method you are saving, in a sense, for a rainy day.

When your earnings improve or increase, you will have more substantial depreciation deductions to apply against those earnings. There usually is no point in increasing a loss or reducing low earnings by claiming additional depreciation deductions when you do not need them.

A point to remember when you are trying to decide whether to buy new or used equipment is that second-hand equipment *must* be depreciated by the straight-line method. This tax factor should be considered, because loss of the opportunity to use the declining balance method with its rapid write-off feature may cancel any immediate savings effected by the purchase of used equipment.

The matter may have been decided and forgotten many years ago, but a basic question businessmen should consider from time to time—and one which has many tax implications—is whether to do business as a proprietorship, partnership or corporation. There may be personal or professional factors that force the selection and maintenance of a non-corporate form of organization, but depending on the earnings of the business and the amount of those earnings you may need to withdraw, there are certain tax advantages to be gained by incorporating a new or expanding company.

Since proprietorship and partnership income is taxed at individual rates, which range anywhere from 20 percent to 91 percent, and corporation earnings are taxed at corporate rates of 30 percent on the first $25,000 earned during the year and 52 percent on the excess, it might appear that if you have relatively low income the proprietorship-partnership rates are lower. However, you must also consider that the corporate tax carries with it the privilege of deducting a reasonable salary paid to an employee-owner. The employee-owner has to pay a personal tax on his salary, of course, but if he were not incorporated, he would have to pay a personal tax on all the money earned by the business.

If the retained earnings of the company are taxed at a corporate rate which is lower than what the personal tax rate would be, the employee-owner would benefit by having additional funds available in the corporation for expansion purposes. These funds may be accumulated in a corporation up to $60,000 without further tax penalties, and even higher if the corporation can prove a need for them.

These advantages—while they may cut your current tax bill and increase working capital for expansion needs—can be lost if you have jumped into a corporation without first reviewing your own long-range cash requirements.

If you are continually forced to withdraw money from the corporate earnings to pay personal expenses, you will have to withdraw these funds in the form of dividends. That means the corporation will have to pay tax on the earnings you are withdrawing as dividends, and you will have to pay tax on the dividends received. The "double tax" on earnings and dividends can nullify any tax advantage from incorporation when earnings must be withdrawn immediately as dividends.

Many businessmen seek professional advice about tax matters as they do professional assistance with their golf game—when the slice has become almost unbearable. You can save tax dollars by realizing that business decisions made in the fall affect the amount of tax you must pay in the spring. Practice year-round tax thinking, and consult a certified public accountant when you are in doubt as to the tax effect of even the most routine business decision. • • •

VINCENT
DRESSER CUTTERS

Milled! for clean, accurate dressings *Tough!* for long service life

Vincent Dresser Cutters are milled for accuracy. Teeth are uniform size, edges are sharp and cutter blade is flat. *Accurate cutters perform accurately.*

Vincent Dresser Cutters are made of special analysis steel, heat treated by the "Vincent Process"—a unique hardening formula developed particularly for this purpose. This process produces uniformly hardened and tempered cutters, heat treated to the exact degree of hardness and toughness required for the best in dressing.

Vincent Dressers and Cutters are made in styles and sizes to meet your every hand dressing need. Your industrial distributor carries a complete stock. Call him today—*specify* VINCENT.

Regular Type

Bushed Type

Extra Thin

VINCENT STEEL PROCESS COMPANY

Producers of: Grinding Wheel Dressers and Cutters . . . HSS Tool Bits . . . Conical Cutters and Holders Diamond Dressing Tools . . . Tube Cleaner Cutters . . . Highway Surfacer Cutters

2424 BELLEVUE AVENUE • DETROIT 7, MICHIGAN

Use postpaid card. Circle No. 221

Here's why Blanchard Wheels are best for Blanchard grinding

Almost thirty years ago, Blanchard began developing and manufacturing better grinding wheels for Blanchard Surface Grinders. Our research first produced silicate bonded wheels, and then resinoid bonded wheels.

Today, Blanchard offers silicate, resinoid and vitrified bonded wheels . . . scientifically manufactured and accurately graded in our modern wheel plant.

Use Blanchard Wheels on your Blanchard Grinders. The correct wheel gives you peak production and economy on each job . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of 1 micro-inch.

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

THE BLANCHARD MACHINE COMPANY 64 State St., Cambridge 39, Mass. GF

Please send "The Art of Blanchard Surface Grinding" (3rd Ed.)

NAME_____ STREET_____

FIRM_____ CITY_____ ZONE____ STATE_____

Use postpaid card. Circle No. 222

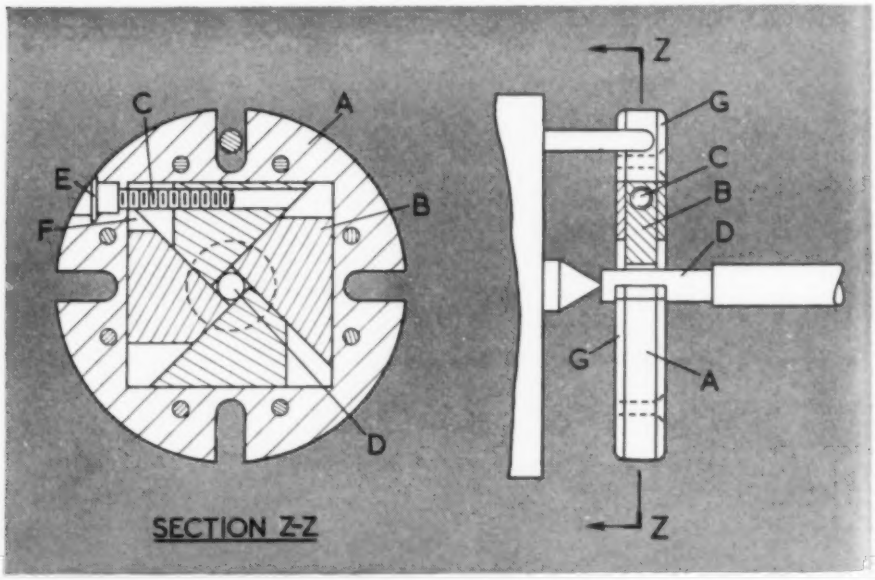
Balanced Work Driver

by **Clifford T. Bower**

In precision grinding of work between centers, perfect dynamic balance of all rotating parts is essential. This is particularly true where super-finishing is desired straight from the wheel and experience has shown that the way to obtain very smooth grinding finishes is to track down a lot of small errors in the machine and the work set-up and to correct them. One of these details, which is illustrated, can be the work driving dog and an unusual design which was evolved for achieving perfect balance at all work diameters within the capacity of the driver.

The actual work gripping medium is a flat plate A in which four jaws B are mounted in a square hole in the plate. The upper jaw can be traversed horizontally (according to the Section Z-Z) by means of a single screw C. Movement of the top jaw to the left will cause all jaws to open and movement to the right will cause them to close on to and grip the work D. It might be mentioned that the mechanical principle of this driving dog is not new; it is employed for adjusting the chasers on a pipe die.

The screw C is a standard socket



Sketch shows the work driving dog and an unusual design for perfect balance at all work diameters within the capacity of the driver.

head bolt which is held in one direction by the shoulder under the head and in the other direction by means of a circlip E. In the fully open position, the left hand jaw straddles the screw by means of the gap F which is cut in it.

The four jaws and the plate A can be sawn out of a single piece of material and provision can be made for finish grinding the sliding surfaces which are in contact with one another. To work efficiently, the sliding surfaces must be smooth and the fit of the jaws when assembled must be with minimum clearance. These drivers are actually made up in an apprentice workshop and are considered to be a very good exercise in precision machine work.

The jaws are supported sideways by means of the side plates G which are of aluminum and held in place by a series of small screws passing through them and the plate A. Four equally spaced slots are cut in the driver periphery to accommodate one or two driving pins on the grinding machine face plate.

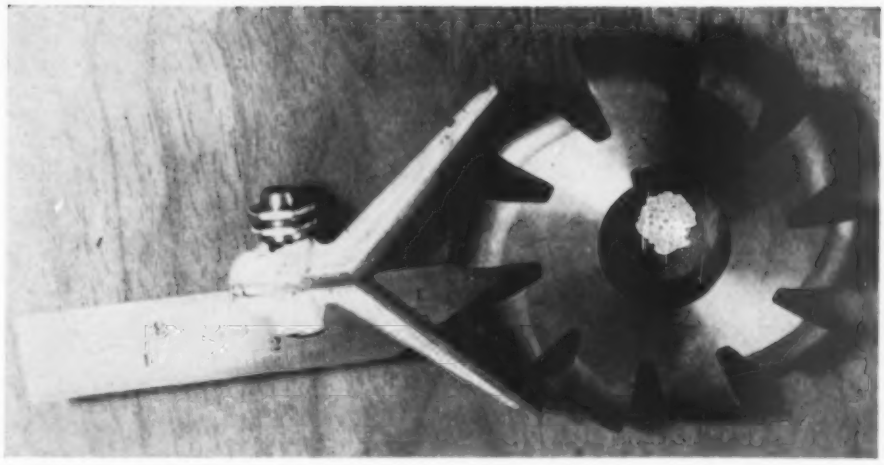
Capacity of the driver shown is 0 to 1 in. diameter. In cases where the work diameter is very small, the driver can be made correspondingly smaller and lighter and of very limited capacity. The driver weight can be reduced considerably by drilling lightening holes through the jaw thickness or by sawing out the interior so that the jaws are merely narrow edged frames instead of solid material. •

Check Form Cutters for Accurate Grinding

by **H. J. Gerber**

Most milling machine form cutters must have the faces of their teeth ground exactly radial if they are to duplicate their true form in the work. This applies to most involute gear cutters as well as other shapes. Checking of the tooth faces after grinding can be done with a common center head square if the blade is modified to fit into the tooth gap.

The illustrated tool was made by grinding off the back side of the standard scale to a rather acute angle so that it enters nicely into even the smaller cutters. By holding the cutter and the checking tool to the light a very accurate and quick inspection of the grinding job can be made. •



Small centering square with one end of the scale backed off to allow it to fit into tooth space on circular form milling cutter. This adaptation of a standard tool will permit checking face grind of each tooth as to whether or not the surface is radial.

Profit Maker

Delpark

- AUTOMATIC, SELF CLEANING
- HIGH CAPACITY
- SAVES FLOOR SPACE
- OPTIONAL PRE-COAT FEATURE
- PERMITS LOW MICRO-INCH FINISH

5-1000 G.P.M. FLOW

Filter-Matic

TUBULAR SCREEN FILTER

The Delpark Filter-Matic will reduce your operating costs. Here are a few of the ways in which savings can be made.

1. Increased machine efficiency in accuracy and productive time.
2. Reduced maintenance cost in eliminating unnecessary machine wear and reservoir cleaning.
3. Extended grinding wheel and coolant life.
4. Lower coolant operating temperature reduces rejections.
5. Permanent filter media . . . adequate in most cases.

The Delpark Filter-Matic can perform these savings and many others for you. Let a Delpark Field Engineer give you the complete story.

Delpark

. . . FIRST in Filtration Advancements

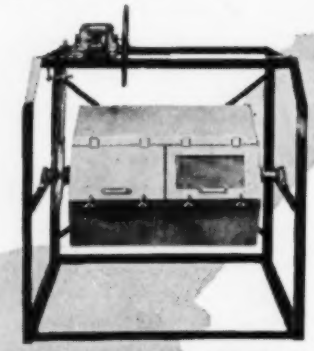
INDUSTRIAL FILTRATION COMPANY
76 INDUSTRIAL AVENUE
LEBANON, INDIANA

Use postpaid card. Circle No. 223

Your Key to
BETTER FINISHING

Only **KRAMER's** Tumblers and Buffers give you SUCCESSFUL PRECISION FINISHING with high savings.

Yes! Kramer's Noiseless, chain-driven Tumblers CUTS DOWN YOUR LABOR COST . . . DEBURRS, DEFLASHES, POLISHES to give you the "PERFECT FINISH LOOK" desired to meet your highest standards.



SINGLE BARREL TUMBLER

Size: 30" x 36" or engineered to your specifications. Barrels lined with kiln-dried and glued maple. Child's play to operate. Economical on space as motors are individually mounted overhead—double decked or single. Tumbling supplies available also.

BUFFING LATHE

1 to 7½ H.P. Ball Bearing V-Belt Drive. Pre-determined speed set at factory or to your specifications. Buffing wheels and compounds available for every industry . . . Special compounds recommended for Special applications.

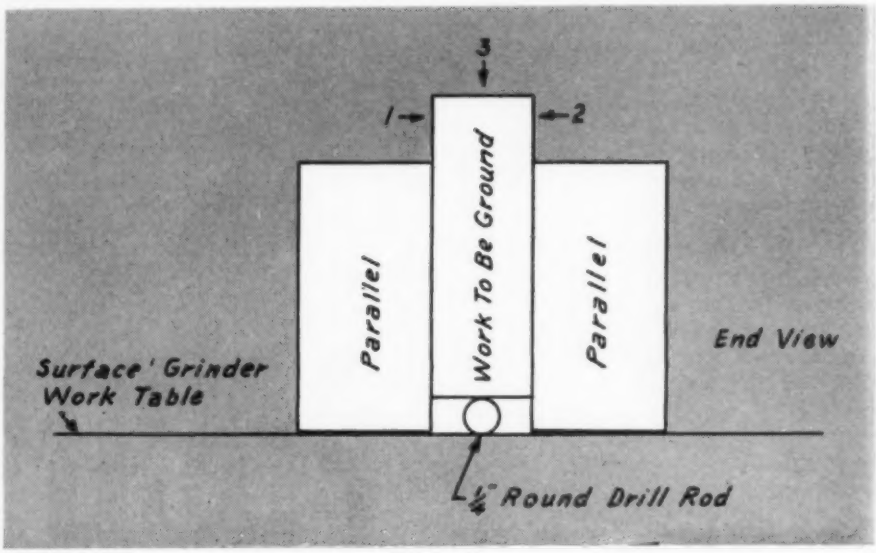
Write Dept. GF for Detailed Information

H. W. KRAMER CO.
120-30 JAMAICA AVENUE
RICHMOND HILL 18, N. Y.

Use postpaid card. Circle No. 224

Square Grinding Without Use of a Vise

by **Christopher H. Hill, Sr.**



Setup shows how the sides of square or rectangular pieces can be ground square without the use of a vise.

The following method illustrates how the sides of square or rectangular pieces can be ground square without the use of a vise.

Place the piece to be ground on the grinding machine table and grind sides No. 1 and 2 to size. Then set up the work as shown in the sketch, the bottom of the piece to be ground resting on a piece of ¼ inch drill rod, the length to be approximately the same as the piece to be ground. Draw the parallels snugly against the sides of the work and with the right hand throw the switch which magnetizes the work table. Then grind the top or No. 3 surface.

After the No. 3 surface is ground the drill rod and parallels can be dispensed and the remaining side can be ground using the grinding machine table only. If real thin work is to be ground in the same manner, parallels will have to be used to support the sides of the work. Your work will come as square as your parallels and work table.

I worked out this method years ago in a shop where I was demonstrating a surface grinding machine, the company not having an accurate grinding vise that could be used on a magnetic chuck. It has proven as accurate as a vise and much quicker.

Help your Heart Fund
Help your Heart

AER-O-MATIC . . .
A PRECISION WHEEL DRESSER that sets new high standards of performance
With many added features including

More cutter discs
Longer cutter teeth
A larger outer diameter
The results are in better grinding with fewer dressings

AER-O-MATIC TOOL COMPANY
5059 W. DIVERSEY CHICAGO 39, ILL.

TERRITORIES AVAILABLE FOR ABRASIVE DISTRIBUTORS

Use postpaid card. Circle No. 225

AT CANADIAN-PRATT AND WHITNEY AIRCRAFT...

ALMCO barrel finishing SAVES 97% on deburring and finishing of spark plug bushings

CUTS DEBURRING AND FINISHING COSTS $2,430 — Threaded spark plug bushings used in famous Pratt & Whitney aircraft engines will be deburred and finished for $2,430 less this year with Almco equipment and processes. Maurice Harrison, Supervisor of Process Planning, shows the small part on which this savings will be made.

● **SAVES .10125 ON EACH BUSHING**—Deburring and finishing threaded spark plug bushings like the one shown at the left, formerly cost $104.20 per thousand when CP & W used speed lathes, portable power tools and other hand methods.

After installing two ALMCO DB-200 Supersheen units, records showed a cost cut of 97%. This equipment turns out 1,000 bushings in 45 minutes, releases grinders and finishers to other duties. Cost reports showed:

$104.20	cost per thousand with power tools.
2.95	cost per thousand with 2 ALMCO barrels.
$101.25	Savings per thousand pieces.

This year CP & W will process 24,000 spark plug bushings, *with a total savings of $2,430 on this one part alone.*

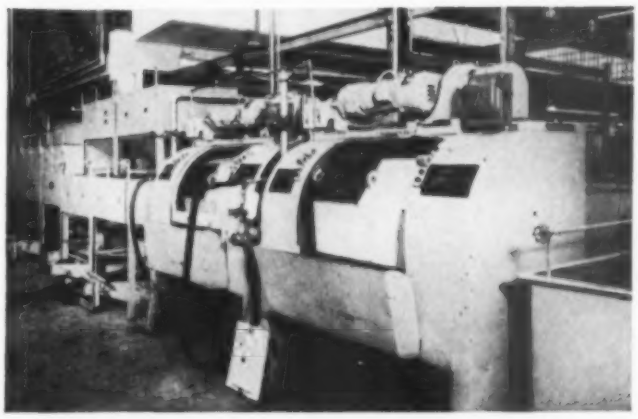
PRACTICALLY ELIMINATES REJECTS—Before installing controlled-type barrel finishing, parts inspectors returned for re-work an average of 125 bushings out of every 1,000 (12½%). With Almco Supersheen equipment and processes, these parts are now finished to a degree of uniformity that is virtually free of rejects.

DESIGNED FOR MANY METAL FINISHING OPERATIONS—In addition to deburring and finishing, ALMCO equipment and processes are used for descaling, degreasing, grinding, burnishing, work-hardening, rust-inhibiting, polishing, etc.

ALMCO has facilities throughout the United States for running sample parts. Write us on your letterhead for the address of an Almco sample processing laboratory or branch office in your area. Your sample, with your specifications, will be handled promptly. You'll get a complete report on where you can save deburring and finishing costs, how you can improve product quality and appearance, and what method and unit is best for your operation. Or, if you prefer, ask an Almco sales engineer to call you.

SEND FOR FREE 52-PAGE BOOK

Full of facts and processes on barrel finishing. Includes detailed cost chart on finishing of typical parts. Send for your copy today.



Two Model DB-200 Almco machines, using Supersheen bonded abrasive chips and compounds, deburr and polish 1,000 spark plug bushings in 45 minutes at Canadian Pratt and Whitney.

ALMCO

DIVISION OF QUEEN STOVE WORKS, INC.

131 Marshall Street • Albert Lea, Minnesota

Sales and Engineering Offices in Chicago, Detroit, Los Angeles, Newark, New Haven, Philadelphia and London, England

Use postpaid card. Circle No. 226

Free Literature

Free Catalogs and Bulletins

Use the postpaid card inside the back cover to receive your copy of any of the literature listed on these pages. Just circle the proper number on the card and mail it. We'll do the rest.

Belt Driven Precision Spindles

Catalog No. 59 presents a line of 56 different spindles, two pages being devoted to each spindle. They are shown with nose, wheel holder and pulley most commonly used. These heavy duty, high precision, belt driven spindles were developed for grinding, milling, drilling, boring, and special applications.

Pope Machinery Corp., Haverhill, Mass.

Use postpaid card. Circle No. 1

Barrel Finishing

Booklet No. 501 includes information on types of barrels, selection of abrasive, cleaners, time cycles, and other important facts about barrel finishing. It includes before and after photographs and case histories of examples of deburring, finishing, and precision forming of radii to blueprint specifications.

Norton Company, Worcester 6, Mass.

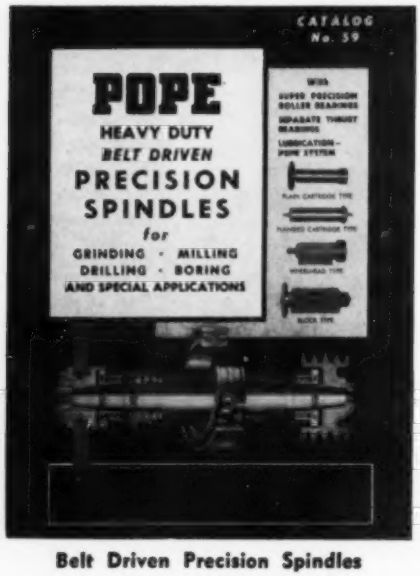
Use postpaid card. Circle No. 2

Precision Finish

Booklet outlines in detail money-saving methods of fitting bearings, gears, slides, pistons, etc., with Timesaver lapping compound. It will not imbed into metal surfaces.

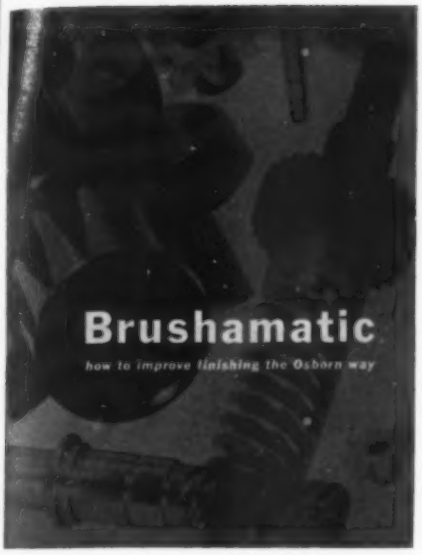
Timesaver Products Co., 629 W. Washington Blvd., Chicago 6, Ill.

Use postpaid card. Circle No. 3



Belt Driven Precision Spindles

Barrel Finishing



Automatic Brushing Machines

New twenty-page two-color folder titled "Brushamatic, How to Improve Finishing the Osborn Way" is now being offered. Brushamatic finishing has a wide range of application, from rough, heavy operations to precise fine finishing. Every degree of mechanization is offered in the Osborn line, from semi-automatic and automatic to fully automated. Illustrations cover actual applications and parts before and after finishing. Charts aid in selection of proper brush. The Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, Ohio.

Use postpaid card. Circle No. 4

Wheel Uses and Markings

Illustrated bulletin on grinding wheel specifications and marking data has been prepared by Electro Refractories & Abrasives Corp., manufacturer of resinoid and vitrified bonded grinding wheels.

The bulletin contains a chart explaining the system by which grinding wheels are marked acording to abrasive material, grain size and combination, grade, structure and bond. The various uses of aluminum oxide and silicon carbide abrasives in grinding are detailed.

Bulletin GD-56 can be obtained by writing Electro Refractories & Abrasives Corp., 344 Delaware Ave., Buffalo 2, N.Y.

Use postpaid card. Circle No. 5

Humidification

Information on the effects of humidity on industrial processes and on plant personnel is contained in a bulletin just issued by Abbeon Supply Co. Systems for controlled humidification of plants is described and illustrated, and prices for industrial capacity humidifiers are given.

Abbeon Supply Co., 179-15A Jamaica Ave., Jamaica 32, N.Y.

Use postpaid card. Circle No. 6

In these FOUR words...

CHART CAM

CROP CRUX

you'll find a better way to grind and polish!

CHART, CAM, CROP, CRUX—these are the basic code names for Buckeye's new C Series horizontal grinders and buffers. You'll have a hard time finding a grinding or buffing job in your plant that can't be done faster, better and more economically with one of these all-purpose tools.

Grinders are available with ⅜"-24, ½"-13 and ⅝"-11 spindle thread, and in a range of speeds that lets you choose just the right tool for any job, from heavier 4" and 6" organic wheel grinding to accurate work with tool post holder. Buffers, with ⅝"-11 spindle thread, will handle 3" to 6" buffing wheels.

Every one of these compact, well-balanced tools has Buckeye's positive speed governor, fully adjustable exhaust deflector, "floating" rotor, one-piece spindle, built-in muffler, and duplex, matched bearings, pre-lubricated and sealed.

Tool maintenance—the easy way!

These new Buckeye horizontal grinders and buffers won't require very much maintenance—and when you do make a routine service inspection, you won't need any special tools. Any one of these Buckeye tools is easily disassembled, and every working part is instantly accessible for servicing—what could be simpler?

CATALOG A-10 ▶ If you don't have a copy of our complete new catalog A-10, you should. We'll gladly send one to you on request.

In Air Tools, Your Best Buy Is Buckeye

Buckeye Tools CORPORATION

DIVISION 45 • DAYTON 1, OHIO

Use postpaid card. Circle No. 227

Dust Control Systems

Bulletin describes Dustkop dust collectors in 32 models with capacities from 300 cfm to 10,500 cfm. Operation of the cyclone-type collector is detailed, and methods are outlined for adapting units for use in many types of shops. Emphasis is placed on use of standard parts and collectors to engineer installations for different shops and sources of dust.

Bulletin 636-3, Aget Mfg. Co., Adrian, Mich.

Use postpaid card. Circle No. 7

Abrasive Belt Splicers

Literature gives specifications and prices of line of electric presses and measuring counters used in splicing abrasive belts. Floor and bench model splicers and presses have capacity up to 50-inch wide belts. Electric presses are thermostatically controlled, set splices quickly, and swing out of operator's way while belt is measured, cut and lined up for splicing.

Econaway Mfg. Co., 722 N. Main St., Bellevue, Mich.

Use postpaid card. Circle No. 8

Air Gages

The 5000 to 1 magnification Dimensionair permits inspection of dimensions to finest practical tolerances, the manufacturer claims. Each graduation of the calibrated dial is equal to twenty millionths (.000020"). Longer range (.0015") gives greater plug clearance; it is easier to insert the gaging plug; there is less scrap; greater jet protection because jets are set .0035" below the surface.

Bulletin also presents the AirProbe, a unit which increases the possibilities of gaging by air.

Federal Products Corp., 1144 Eddy St., Providence 1, R.I.

Use postpaid card. Circle No. 9

Here's How Simple Polishing Can Be . . .

with the JOHN CRANE *Portable* Polishing Stand

Yes! Here's an effective method for handling polishing paper that has a definite place in many inspection departments and mechanical laboratories. The JOHN CRANE Portable Polishing Stand provides in a matter of seconds a wrinkle free 12" x 12" section of paper held absolutely taut over a metal stage that has been lapped to provide a perfect polishing surface. It also permits the instant replacement of this section of paper once it becomes worn.

For further details and other facts on this very practical tool, write for Bulletin L-410.

Lapmaster DIVISION

Crane Packing Company
6417 Oakton St., Morton Grove, Ill.
(Chicago Suburb)
In Canada: Crane Packing Co., Ltd., Hamilton, Ont.

38 YEARS INDUSTRIAL PROGRESS

Use postpaid card. Circle No. 228

Grinding Wheels

Bulletin illustrates and describes break-resistant Duraflex reinforced grinding wheels. They are heavily reinforced with strong fabric, bonded with resins; are made with a depressed center. Their ruggedness recommends them particularly for rough grinding, reducing heavy welds, undercutting and notching.

American Emery Wheel Works, Providence, R.I.

Use postpaid card. Circle No. 10

Dimensional Control Equipment

Catalog 56-D explains the balanced air system used in the Dimensionair air gages and lists advantages claimed for this system. Precisely calibrated scale allows gage to be set with only one master. Stability of gage eliminates creep or drift once it is set. Catalog contains an expanded list of air plugs, both through hole and blind hole.

Federal Products Corp., 1144 Eddy St., Providence 1, R. I.

Use postpaid card. Circle No. 11

Steel Shop Equipment

Reference Manual of Steel Equipment No. 85 just off the press, 48 pages, analyzes all types of steel shelving, drawers, lockers, work benches and tables, and other storage, store, office, warehouse, and shop equipment.

Equipto, Aurora, Illinois.

Use postpaid card. Circle No. 12

Machine Rebuilding

"The Simmons Way," publication of the Simmons Machine Tool Corp., Albany, New York, describes the rebuilding and modernization by Simmons of a huge Mesta roll grinder and a 14'/22' extension-type vertical boring mill. Also shown are Simmons Horizontal Boring and Facing Machines of various capacities.

Simmons Machine Tool Corp., 1701 North Broadway, Albany 1, N.Y.

Use postpaid card. Circle No. 13

Grinding Wheel Adapters

A new 8-page catalog featuring a complete line of grinding wheel adapters and toolroom and grinding accessories has just been issued by Wm. Sopko & Sons Company. Included are four styles of adapters for wheels from ½" to 2" in width, with both L.H. and R.H. threads, for use on 25 different makes of popular surface, tool and cutter grinders. Also cataloged is a long extended type adapter as well as reversible wheel adapters designed for diamond wheel use. Other items are wrenches, truing arbors, quills, and other grinding accessories.

Wm. Sopko & Sons Co., 140 East 267th St., Euclid 32, Ohio.

Use postpaid card. Circle No. 14

Optical Gear Analysis

32-page optical comparator engineering study, "Optical Analysis of Gears and Splines," has been prepared by Jones & Lamson Machine Company, to outline a new method of inspecting and analyzing fine pitch involutes. In the case of gears the accuracy of the involute form on the teeth determines power flow between meshing gears. The new method of inspection described in this study involves use of a single master chart for a wide range of sizes of gears, rather than making a master chart for each particular form to be inspected.

Jones & Lamson Machine Co., Comparator Division, Springfield, Vt. Form HU-5448.

Use postpaid card. Circle No. 15

Segmental Type Circular Saw

Metal-cutting segmental type circular saw described in folder has no rivets to limit sharpening. Pin-lock feature keeps high-speed steel segments in alignment while allowing fast, clean cutting with minimum waste.

Henry Disston Div., H. K. Porter Co., Inc., Philadelphia 35, Pa.

Use postpaid card. Circle No. 16

Anchor Bolt Cement

A new 2-color bulletin describes Evr-Tite, a pourable cement for holding anchor bolts. Anchor bolts can be securely fastened in 3 easy steps. These consist of preparing the hole, placing the bolt in position and pouring in fluid Evr-Tite. The method is said to be applicable to fastening pipe flanges, hand rails, partitions, and all types of machinery.

Form 1091, The Monroe Company, Inc., 10703 Quebec Ave., Cleveland 6, O.

Use postpaid card. Circle No. 17

Omni-Vise

This precision universal vise is designed to provide maximum holding force and complete flexibility for grinding and milling operations. Adjustment in all three planes cuts setup time and allows settings for any complex angle. Each scale has cut-in graduations by single degree increments for setting work positions. Overall height is 4¾-in., base is ground for use on magnetic chucks.

Victor Mfg. Co., 183 High St., Boston 10, Mass.

Use postpaid card. Circle No. 18

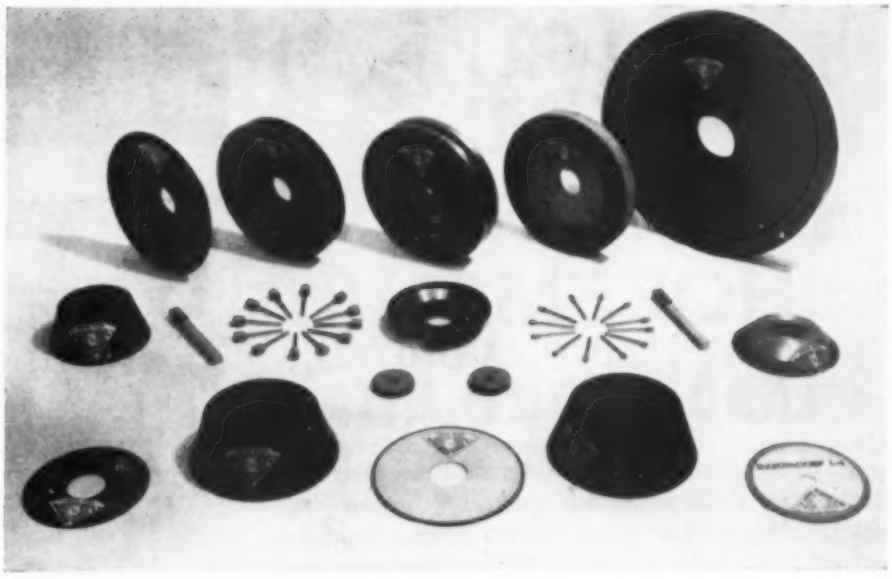
Vernier Calipers

Form No. M17 describes vernier calipers with a non-glare, dull chrome finish. Long vernier plate is easily read. Long bearing surface of sliding jaw reduces any tendency to deflect.

Form No. M22 shows the Tri-Cal stainless vernier caliper No. 577. Two integral pairs of jaws take inside and outside measurements with equal facility; narrow end of sliding bar reaches deep into slots for depth measurement.

Brown & Sharpe Mfg. Co., Providence, R.I.

Use postpaid card. Circle No. 19



ACE OF DIAMONDS brand diamond wheels frontrunners for excellence in American Industry. Assures you of the finest—maintained through modern facilities and rigid standards. ACE OF DIAMONDS a name to remember!!

Products of over 30 years experience

MANUFACTURERS OF:

Resinoid - Metal - Vitrified **Powdered Metals**
Diamond Wheels **Allied Products**

TELEPHONE: CEnter 9-4602

THE PAUL L. KUZMICK CO.
271-279 GROVE AVE., VERONA, N. J.

Use postpaid card. Circle No. 229

Up To 15,000 Pieces With One Bit!

naturally . . . it's a HOFFMAN ORIENTED DIAMOND LABORATORY BIT

Up to 15,000 Godet Wheels—center hole tolerance 1.05 min. to 1.503 max.—all ground with one Hoffman Laboratory Bit. These actual figures from the production records of a large Eastern manufacturer are being duplicated by many users of Hoffman Bits. For tough, precision drilling of glass, ceramics, quartz, etc. Hoffman Diamond Bits can revolutionize your finishing techniques for better products at lower costs.

In oriented diamond surface set or impregnated, Hoffman Laboratory Bits last many times longer than ordinary bits because each bit is designed and tested for the specific job.

Write for Illustrated Literature and Prices.

HOFFMAN BROS. DRILLING CO.

Drilling Experts Since 1902

102 Cedar Street

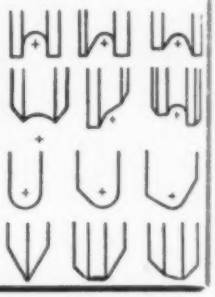
Punxsutawney, Penna.

Use postpaid card. Circle No. 230

WHY WASTE TIME?

Dress Profiles like these in a few minutes without Templates or Crusher Rolls with the Jeon Automatic Angle Tangent to Radius Dresser. It's fully universal.

Patented



Write for Price and Folder. Representatives Wanted.

CONCAVE DRESSING TOOL

JEON MANUFACTURING CO.

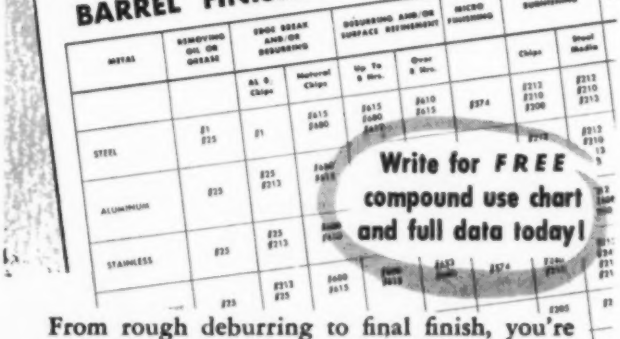
P. O. BOX 6750 WASHINGTON 20, D. C.

Use postpaid card. Circle No. 231

help your HEART FUND help your HEART

NEVER A DOUBT

with ESBEC BARREL FINISHING COMPOUNDS



Write for *FREE* compound use chart and full data today!

From rough deburring to final finish, you're always sure of superior results in less time at lower cost with Esbec Compounds:

- ★ *Full selection for every operation and every material.*
- ★ *Color-coded for easy, quick identification.*
- ★ *Performance and economies proven throughout industry, and under all water conditions.*

EQUIPMENT COMPOUNDS ABRASIVES

ESBEC BARREL FINISHING CORP.

202 Beech St., Byram, Conn.

Use postpaid card. Circle No. 232

New Equipment and Materials

Use the handy postpaid card inside the back cover to receive more information on any of these products. Just circle the proper number on the card and mail it. We'll do the rest.

What's New in Equipment and Materials

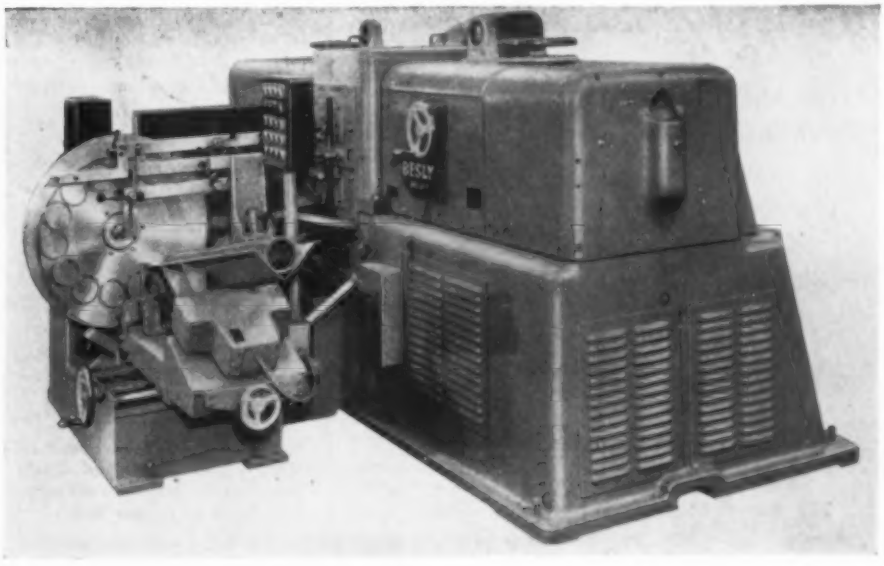
30-Inch Double Disc Grinder

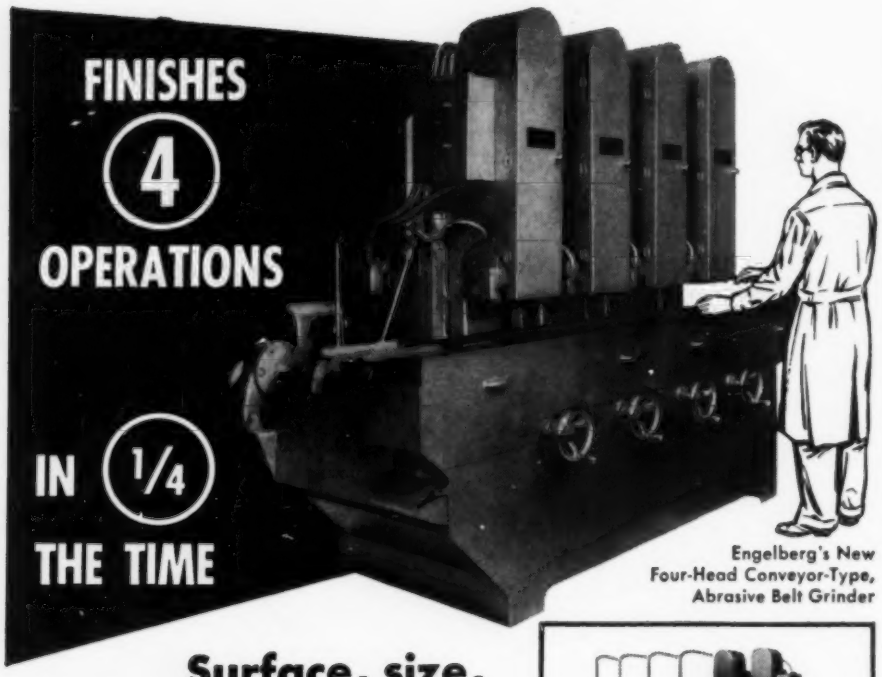
No. 240 - 30" Double Horizontal Disc Grinder has been introduced by Besly-Welles. It has all spindle motors contained within the base, with push-button controls on both sides. According to the maker, the improved design reduces maintenance, dressing, wheel changes and set-up down time as much as one-third.

With push-button controls and at-a-glance reading of head and disc alignment, sealed spindle quill construction, automatic push-button dressing, automatic sizing to adjust for disc wear, edge-grain Formica wearing ways, head assembly neoprene sealed against dust and coolant, magnetic rotary through feed, and easy disc removal—the manufacturer claims that this machine is the most accurate (.0001" for parallelism) and most practical grinder available for high speed precision finishing of piston rings, bearing rings, automatic transmission plates and similar shapes.

The Besly-Welles Corporation, South Beloit, Wisconsin. •

Use postpaid card. Circle No. 101





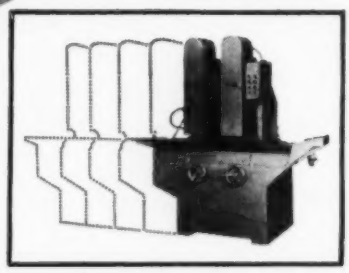
Engelberg's New Four-Head Conveyor-Type, Abrasive Belt Grinder

Surface, size, Semi-finish, Fine Polish . . . in ONE Pass!

Talk about high speed production. You will — when you see Engelberg's new multi-head conveyor-type abrasive belt grinder precision size and fine finish *any* ferrous, non-ferrous, plastic or other flat surface. *With one machine — one operator — and one pass* — you can now complete *four* different grinding and polishing operations.

Think of the costs you can slash on high-volume runs. Think of the time you can save on set-ups and changeover. And the initial cost is far less than you'd have to pay for separate machines.

SEND SAMPLE PART TODAY for cost-and-time-savings estimate. Or if more convenient, an Engelberg Production Engineer will be glad to discuss your grinding problems. No charge — no obligation, of course.



Choice of 1 through 6 grinding heads with 6", 8", 10" or 12" belt width.

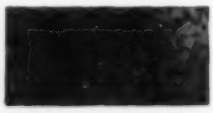
Parts Finished in ONE Pass

Chain Saw Bars — 4 head operation removing .004" per head for total .016" per pass with conveyor belt speed of 6' per min.

Roger Dean FORD

Name Plate — 3 head operation using #240, #320 and #500 grit abrasive belts with conveyor belt speed of 14' per min.

Skate Blades — 5 head operation using #120, #180, #240, #320 and #500 grit abrasive belts at 12' per min. conveyor belt speed.



Rubber Tile — 3 head operation using #240, #400 and #600 grit abrasive belts with conveyor belt speed of 21' per min.

ENGELBERG

HULLER CO., INC.

321 Seneca St. Syracuse, New York

Use postpaid card. Circle No. 233

Delpark Announces New Tubular Screen Type Filter

The Delpark Filter-Matic Filter has been announced by Industrial Filtration Co.

Small diameter screen tubes are manifolded together into a common suction header through which the sludge laden liquid is drawn by a special multiple chamber valve and pumped into a filtered liquid compartment. As the screen deposits reduce the liquid flow through the screen tubes, the unfiltered liquid level begins to rise. At a predetermined level, a float actuates a switch controlling the multiple chamber valve, reversing the flow of the liquid. The reversed flow backwashes accumulated deposits from the screens. As the reverse flow of clean liquid causes the unfiltered liquid to continue its rise, the float again reverses the flow of liquid through the valve, returning to the filtering cycle.

Sludge removed from the screen tubes drops to the bottom of the filter compartment where it is removed by chain driven dragout flights.

When precoat is used, an automatic measuring device with a vibrating mechanism to prevent bridging of the precoat material is mounted above the filter inlet and automatically feeds

M-B PNEUMATIC GRINDERS

JUNIOR
(Model M-CR-B)

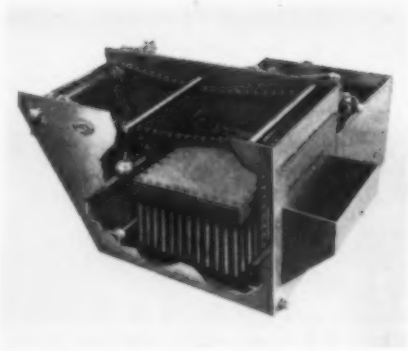
75,000 R.P.M.
Does a Man's Size Job

A smaller but husky model that can be used on many operations where a lighter weight tool is advantageous. Stays on the tough jobs day in and day out. 4 TYPES: 2 types of spindle extension; 2 types of air control valves; steel body; grease-sealed bearings; light weight, 12 ounces. Accommodates mounted grinding wheels, rotary files, etc. SPEEDY—Will operate Tungsten Carbide Burs, Rotary Files, etc. to their full efficiency. Also other models.

WRITE FOR LITERATURE

M-B PRODUCTS
46 VICTOR AVE., Div. 21
DETROIT 3, MICHIGAN

Use postpaid card. Circle No. 234



Delpark Filter-Matic tubular screen type filter.

a predetermined amount of precoat material at each backwash period. This precoat feeding device is actuated by the air cylinder feed which operates the multiple chamber valve. This automatically adds new precoat at the same time the old precoat is backwashed from the tubes. For further information write to George L. Guymon, Vice President, Dept. FM-478, Industrial Filtration Co., Lebanon, Ind.

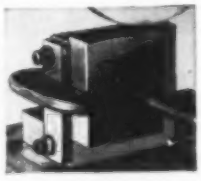
Use postpaid card. Circle No. 102

Metal Powder Spray Unit

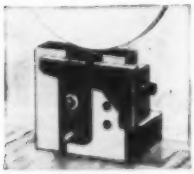
A new metal spray unit for applying hard-facing alloys and other metals in powder form is now available from

LASSY MASTER V-BLOCK ANGLE PLATES

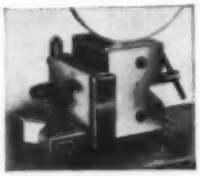
This Master V-Block Angle Plate is an improved new design. Saves hours of setup time. Assures precise work accuracy. Requires less skill.



Side Gage automatically squares work precisely and without removing angle plate from chuck. Repetitive accuracy maintained.



Adjustable parallel holds the smallest work for position and clamping with ease and accuracy.



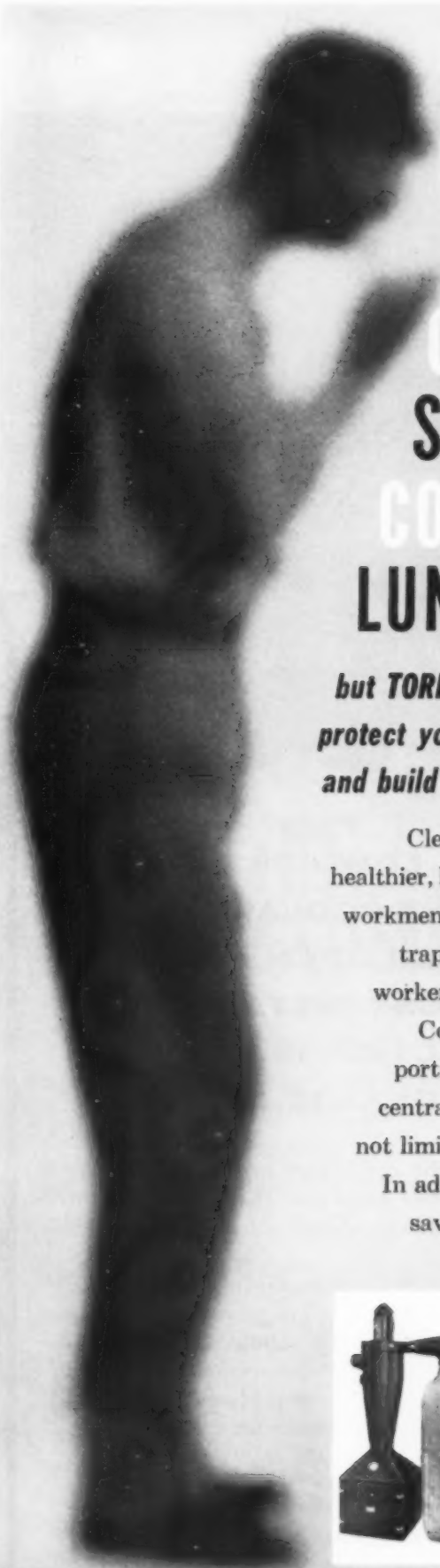
LASSY MASTER Angle Plate provides a master setup for regrinding of worn or inaccurate Angle Plates.

WRITE FOR DESCRIPTIVE LITERATURE

LASSY TOOL COMPANY

PLAINVILLE, CONNECTICUT, U.S.A.

Use postpaid card. Circle No. 235



DUST BURNS EYES CHAFES SKIN CONGESTS LUNGS

but TORIT Dust Collectors protect your workmen and build good morale

Clean working areas make healthier, happier, *more productive* workmen. Torit Dust Collectors trap dust before it irritates workers. Unitized Torit Dust Collectors are completely portable—cost a fraction of central built-in units and are not limited to particular areas. In addition, Torit Collectors save heat by recirculating clean filtered air.

Free descriptive handbook describes all models and applications. Write today to . . .

TORIT MFG. CO. Department 512 311 Walnut Street Saint Paul 2, Minnesota

Use postpaid card. Circle No. 236

1 Part
W+B
Grinding Concentrate 1500

in 150 parts water

GIVES YOU A LOW-COST, TRANSPARENT COOLANT THAT KEEPS WHEELS OPEN • CHIPS SETTLE ALMOST INSTANTLY
•GRINDING ACTION IS KEENER
•STOCK REMOVAL IS CLEANER

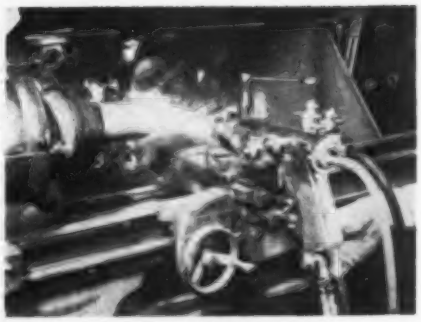
Our files are bulging with case-history proof of the success that many plants have had when they changed to W & B Grinding Concentrate 1500 for grinding ferrous metals and titanium.

Pick up your phone or use the postage-paid reply card that is bound into this magazine to get job-proven information about this entirely different type of grinding coolant that was *developed for you by the company that originated grinding lubricants!* It's smart to improve *your* production by taking advantage of W & B's 69 years of experience and know-how!

W+B INDUSTRIAL LUBRICANTS

THE WHITE & BAGLEY CO.
Worcester, Massachusetts • Detroit, Michigan
Originators of Grinding Lubricants

Use postpaid card. Circle No. 237



Model C-2 Spraywelder in action.

Wall Colmonoy Corporation, Detroit. The new unit features improved metal flow rates and increased deposit efficiency with no sacrifice in quality of the sprayed deposit.

Designated the Model C-2 Spraywelder, the new model is designed for use in applying hard-facing powders to most types of steel (including stainless steel), cast iron and copper parts by the Sprayweld process (Figures 1). In this process, the powdered alloys are first applied by spraying and then are fusion-bonded to the part by heating with an oxy-acetylene flame.

Metal spraying operations using aluminum, zinc, copper, nickel, stainless steel, brass, lead or high temperature brazing alloys in powder form can also be readily handled.

Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich. •

Use postpaid card. Circle No. 103

Another
VICTOR VALUE
Top Quality
Lowest Prices
Our special import . . .
DIAMOND WHEEL DRESSERS

Made of selected, full individual stones mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
¼	$ 6.00	$ 2.85
½	12.00	5.00
¾	21.00	7.50
1	30.00	10.25
1½	54.00	15.00
2	75.00	20.00
2½	102.00	26.00
3	130.00	32.00

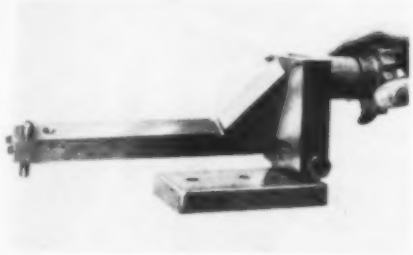
These diamonds can be set in any shank to your specifications for $1.00 each extra.

Order today—Immediate Delivery from Stock!

VICTOR
MACHINERY EXCHANGE, INC.
Dealers in Tool Room Equipment
Dept. F, 251 Centre St.
Tel.: CAnal 6-5575 New York 13, N.Y.

Use postpaid card. Circle No. 238

Sommerset "Giant" Radius Dresser



Somerset Tool Company has announced a special large model dresser accurate to .0002". Designed for large surface grinders, the Somerset "Giant" radius dresser shapes and dresses large diameter grinding wheels either concave, convex or combinations of both. It is also adaptable for use on cylindrical grinders. The operation of the Somerset "Giant" is open and easy to see. There is no need to remove the wheel guard as the wheel is dressed from below. Stop pins allow complete adjustment from 90° through 180°. Diamond dressing points are set by measuring with a micrometer from top of measuring hood to bottom of dresser arm.

Somerset Tool Co., Virginia St., Hillside, N.J. •

Use postpaid card. Circle No. 104

WALLS TU-WAY BELT SANDER

USE IT EITHER WAY

Full 1/3 h.p. G. E. Motor

At last, a top quality industrial sander that provides all the most wanted features — yet sells for so little.

complete with cord, plug, switch ready to use **$89.95**

Illustrated Literature on Request

A few desirable distributor territories still available.

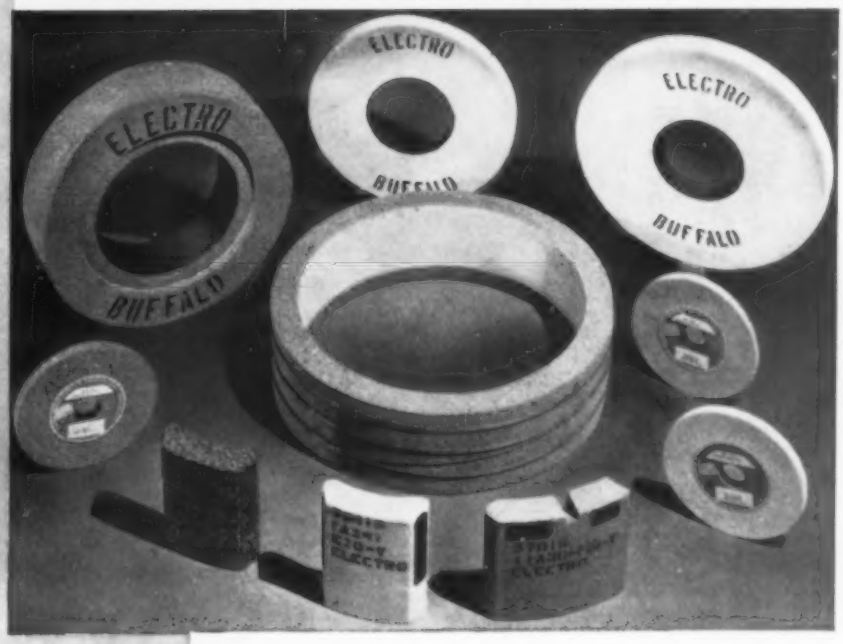
WALLS SALES CORPORATION

333 Nassau Avenue Brooklyn 22, N. Y.

Use postpaid card. Circle No. 239

NEW VITRIFIED GRINDING WHEEL DEVELOPMENT by ELECTRO!

A MODERN APPROACH TO PRECISION SURFACING WORK



Electro SINCE 1919

"20 STRUCTURE"

. . . presents an entirely new type of grinding wheel construction. The unique induced porosity of Electro "20 STRUCTURE" gives wheels and segments a grinding quality particularly desirable for surface grinding.

USE "20 STRUCTURE" FOR—

- COOLER GRINDING
- RAPID STOCK REMOVAL
- HEAVIER CUTS
- ELIMINATION OF BURN AND HEAT CHECK
- TRUE SURFACE FLATNESS

A TEST

"20 STRUCTURE" may well raise your standards of good surface grinding performance. Why not order a trial wheel or set of segments for your surface grinding application!

Electro Refractories & Abrasives Corp.

BUFFALO 2, NEW YORK

Use postpaid card. Circle No. 240

clear transparent

K-7

NEVER LOADS THE WHEELS

K-7 solutions do not load work wheels, and this important advantage means (1) fewer dressings, (2) longer wheel life and (3) a true ground finish (rather than a burnished or smeared finish). In addition, with K-7 (because it does not load) you can often use a harder (1-2 grades) and finer (10-20 points) grit wheel, resulting in better work at lower cost.

Investigate K-7 for use in grinding all steels, cast and malleable irons, titanium, carbon, rubber, ceramics and plastics. (Not recommended for non-ferrous metals.) It is an all-chemical water soluble liquid concentrate, transparent and colorless in solution. It is non-foaming and runs absolutely flat under all conditions. Low pH (alkalinity) makes it easy on the skin. Send for details.

CONCENTRATION TEST KIT

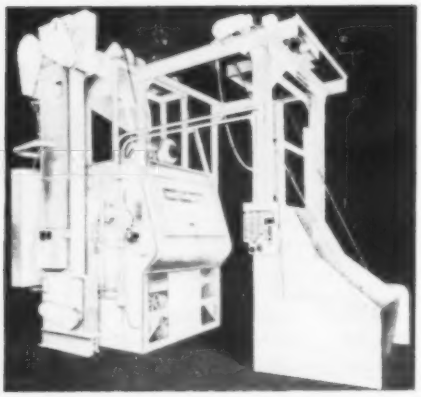
With this pocket size Concentration Test Kit K-7 users can check the concentration of the solution right at the machine. Only takes a minute or two.

THE Lusol.. LINE
BETTER PRODUCTS FOR BETTER METALWORKING

F. E. ANDERSON OIL COMPANY INC.
BOX 218, PORTLAND, CONNECTICUT

Use postpaid card. Circle No. 241

New Size Blast Cleaning Machine



A Super Tumblast airless abrasive blast cleaning machine of 14-cu. ft. capacity for cleaning sand, scale, oxides, and other contaminants from metals has been introduced by Wheelabrator Corporation. This batch-type machine is for work that can withstand a tumbling action. It has an operating load capacity of 14 cubic feet.

One of the keys to faster cleaning in the Super Tumblast is high-capacity abrasive-hurling wheel that throws 830 pounds of abrasive per minute, more than twice as much abrasive per minute as similarly sized wheel previously used. The abrasive shower from the

CLIPPER

PRECISION DIAMOND TOOLS

Industrial Diamonds
Thread Grinders
Turning Tools
Engraving Tools
Dressing Tools
Diamond Powder

Manufacturers of
DIAMOND TOOLS
and
WHEELS

BRANCH OFFICES

CINCINNATI, STEVE URBAN, 122 Springfield Pike

CLEVELAND, BILL WIESE, 8905 Lake Ave.

DETROIT, FLOYD BEARSS, 1433 Northwood Blvd., Royal Oak, Mich.

INDIANAPOLIS, IVAN STRANGE, 33 Tyler Ave., Greenfield, Ind.

PHILADELPHIA, H. J. MILLER, Valley Brook Rd. and Glen Mawr Dr., Ambler, Pa.

ROCHESTER, N.Y., DON GINEGAW, 10 Oak Manor Lane, Pittsford, N.Y.

SYRACUSE, N.Y., BARNES & JORDAN, INC., 409 E. Jefferson St.

Representatives in Principal Cities

CLIPPER DIAMOND TOOL CO., INC.
345-E HUDSON ST. NEW YORK 14, N.Y.

Use postpaid card. Circle No. 242

new wheel spreads over the cleaning chamber in a uniform manner and cleans faster.

Wheel maintenance problems have been minimized by the use of newly designed blades that give twice the life of conventional blades, a strain-free blade holding device to reduce breakage and simplify replacement, a new easy-access wheel guard housing, and a new completely revised system of Long-Lyfe wheel guard liners.

The 14-cubic-foot Super Tumblast is available with either of two separators, one for foundry applications and the like, and another for less exacting requirements. The separator insures that every pellet thrown by the wheel is effective metal shot or grit and that the optimum abrasive mixture is maintained throughout the blast cycle. It is mounted at the bottom of the machine for easy servicing.

Wheelabrator Corp., Mishawaka, Ind. •

Use postpaid card. Circle No. 105

Pump Unit Handles Abrasive Materials

A newly developed pump and tank unit safely handles abrasive materials such as silicon carbide solutions, etc., on honing, lapping and ultrasonic machines. There are no bearings, seals, packings or dependent close tolerances in contact with the material being pumped.

The assembly consists of 1/10 HP Gusher centrifugal pump and a sturdy tank complete with inlet and discharge pipe connections, and also electric cord and plug. An even mixture of the liquid is maintained automatically at the internal hemispherical shaped tank bottom. The tank is available in all stainless steel or standard carbon steel as specified.

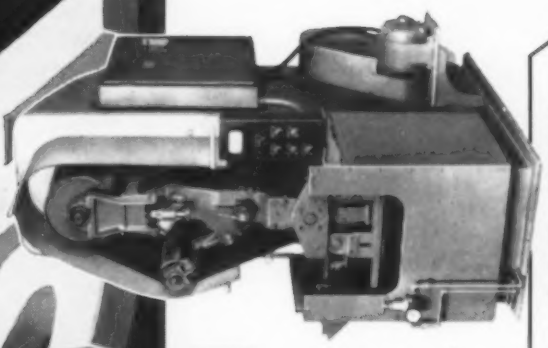
The Ruthman Machinery Co., Cincinnati 2, Ohio. •

Use postpaid card. Circle No. 106

FINISH

THE WAY TO BIGGER PROFITS!

★ Pre-polishes greater area in less time than any contour polishing.
★ Lowest square foot cost of any method.
★ Saves stock cost by use of cheaper surface finish steel.
★ Improves press and die action.
★ Pre-polished steel gives outstanding results for even most exacting plating processes.
★ Uniform, pre-polished surface affords greater plating protection with minimum plate thickness.
★ Finishing before forming, cuts unit cost.
★ Rejects due to base metal finish are eliminated.



MICRO-POLISH units may be used singly or in line to suit your needs.

COMPLETE PACKAGE!
Murray-Way can give you a single machine or a completely automated production line engineered specifically to your requirements. We welcome your inquiries.

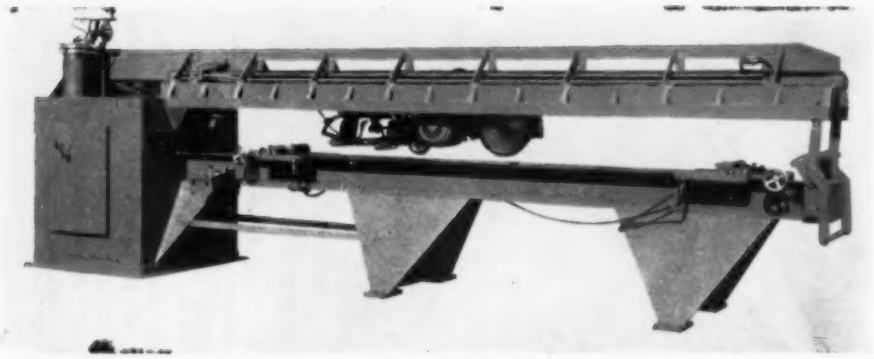
MURRAY WAY

Polishing, Buffing, Grinding, Filtering Equipment that automatically cuts your costs..

MURRAY-WAY CORPORATION
P. O. BOX 180, MAPLE ROAD EAST • BIRMINGHAM, MICH.

Use postpaid card. Circle No. 243

Seam Weld Polisher



The Hi-Lite Model WP 10′ Seam Weld Polisher is a machine utilizing a 1″ x 132″ abrasive belt for rough grinding and polishing seam, or butt welds on stainless or carbon steel sheets. Capacity of the machine is 10′ length on flat sheets, and 10′ length and a minimum of 30″ on the inside weld of an open end cylindrical tank.

Sequence of operation is as follows: The welded section is slid on the bed, roughly lined up and clamped to the bed plate with the air clamps. Final line up with the track of the belt is then made with the hand wheels. Limit blocks are placed on the carriage chain drive at the proper places for the length of weld to be polished. These directly reverse the carriage at any time when reaching the end of the weld. With the control buttons the operator can directly reverse the carriage in its travel, thereby working any particular part of the weld which may require special attention. Pressure is applied to the belt contact wheel by an air cylinder, which is adjustable for light or heavy pressure.

An oil spray system is incorporated in the unit for maximum abrasive belt life and also rapid stock removal. •

Use postpaid card. Circle No. 107

Walker-Turner Introduces New Line of Grinders, Dust Collector

A complete new line of "light-heavyweight" grinders and a new dust collector have been introduced by the Walker-Turner Division of Rockwell Manufacturing Company.

The new line includes a 6-inch bench grinder, 6-inch carbide tool grinder, 7-inch tool grinder and a surface grinder—in addition to the dust collector.

Six-inch carbide tool grinder—Cast-iron tables, riding on widely-spaced trunnions for maximum rigidity in operation, facilitate vibration-free grinding. Tables tilt 30 degrees in and 45 degrees out to permit wet or dry grinding at any angle. Conveniently located reversing switch instantly reverses rotation of the wheel, making it possible to do all grinding on the downward motion of the wheel. The new tool retails at $187.75 (single-phase).

Seven-inch tool grinder—Machined tool rests are fully adjustable for angle desired. It has a specially designed motor with extra-long shafts providing

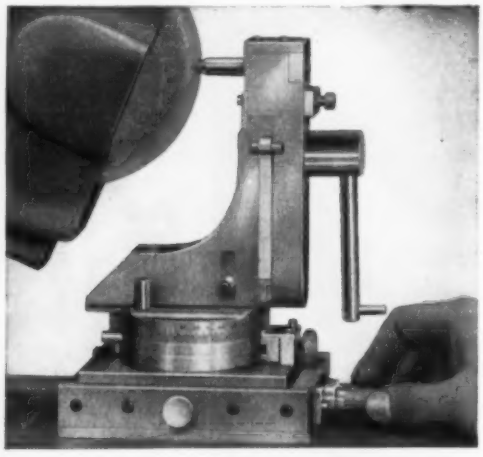
Walker-Turner 6-inch carbide tool grinder.

Tough Grinding Wheel Forms Dressed Easy as A, B, C

eliminate elaborate set-ups and operations

.0001" ACCURACY

Fluidmotion
WHEEL DRESSERS
dress two angles tangent to a radius in one continuous motion



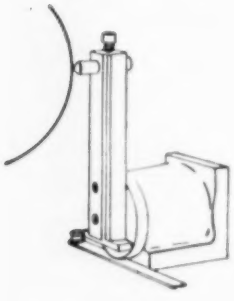
With the unique "Fluidmotion" Dresser, you can dress two angles tangent to a radius — using one handle in one continuous motion. Operation is so fast and simple that beginners can use them.

Adaptable to all type cylindrical and surface grinders.

A. Obtain micrometer reading; add required convex radius or subtract required concave radius.

B. Loosen jib with wrench and "mike" over lower pins to reading obtained above.

C. Tighten jib. Set stops for two angles. Ready for action.



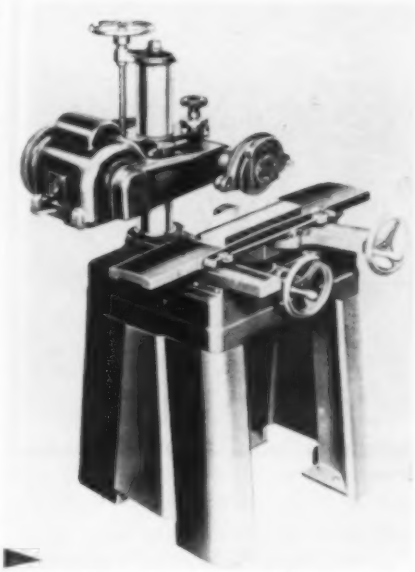
Also available: "FORM MASTER" Dresser, capable of dressing any radii up to 12" convex, up to 15" concave.

See your industrial distributor or write for free literature.

WHEEL DRESSERS · J&S TOOL CO. INC. · JAW CLAMPS · PRECISION VISES · DOWN-HOLDING DEVICES **CLAMPCUT** PARALLEL BARS

J & S TOOL CO., INC. | 880 DORSA AVE. LIVINGSTON, NEW JERSEY

Use postpaid card. Circle No. 244



Walker-Turner surface grinder

ample clearance between wheel and motor. Advanced safety features—including double-strength, shatterproof glass safety shields, heavy cast iron guards, removable steel side plates, adjustable spark deflectors and integral dust chutes—make this an extremely safe grinder. It retails at $170.65 (pedestal type).

Surface grinder—combines accuracy, simple set-up and unusually low cost ($628.75, single-phase model; $625.25, 3-phase). It offers the extra ability to do chip-breaker and tool and cutter grinding.

Features include column with 360-degree swivel, ½-inch-by-½-inch key and adjustable gib, cross slide which can be locked to base when transverse travel is not required; traverse screw protected by canvas covers.

The longitudinal slide (table) surface is finish-ground by its own spindle as a final machine test.

Six-inch bench grinder takes up minimum space for grinding, polishing and buffing. Balanced grinding wheels and precision-ground shaft provide smooth, accurate performance. Retail price is $58.

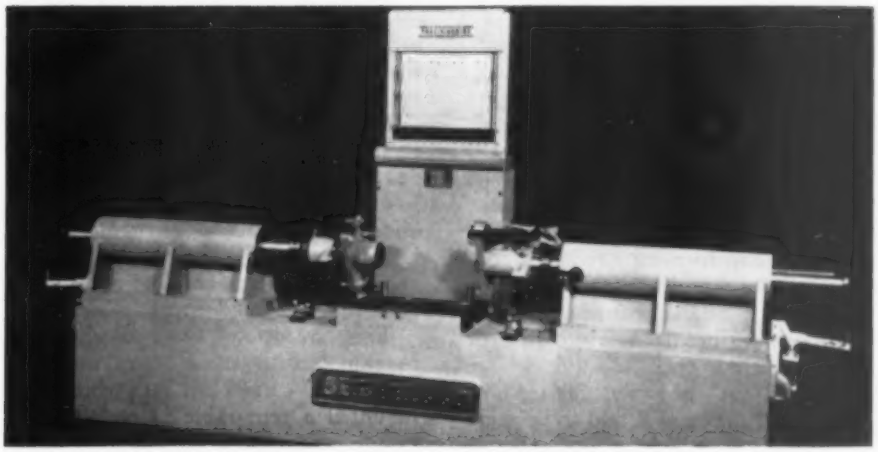
Dust Collector—features a pressed steel cabinet, removable filter, and enclosed 1/3-horsepower motor that moves 350 cubic feet of air per minute. The unit is compact and portable.

Motor is in a separate, dustproof compartment and runs on lubricated-for-life ball bearings. A large door at the back of the unit provides quick access to the fireproof, cleanable filter, and a door at the top facilitates inspection of the motor.

It retails at $197.50 (single-phase) and $199.50 (3-phase).

Walker-Turner Division, Rockwell Manufacturing Company, 400 N. Lexington Avenue, Pittsburgh 8, Pa. •

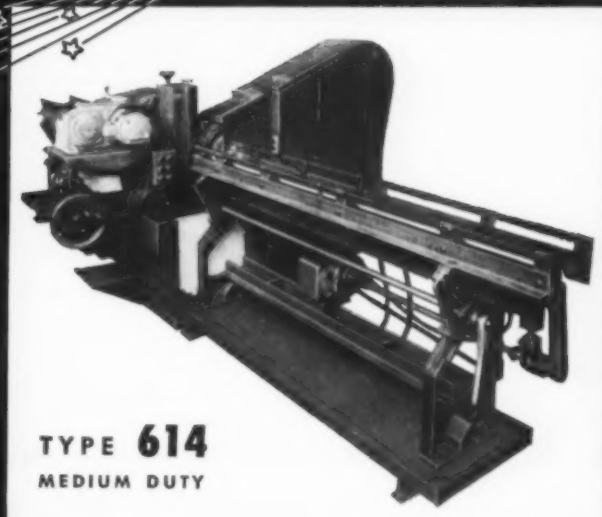
Use postpaid card. Circle No. 108



DEPTH, DIAMETER AND FLATNESS GAGE — This 12-column Precisionaire pneumatic gage inspects three depths, four diameters, and five points of flatness of a transmission housing. In operation, the part is slid onto the serrated surface and positioned by spring-urged tapered locators, air-retracted. Then the spindles are progressed into position for gaging diameters and depths. Five gaging cartridges mounted in the serrated surface plate are used to gage flatness. Standard Production Instruments Div. No. 610, The Sheffield Corporation, Dayton 1, Ohio, U.S.A.

Use postpaid card. Circle No. 109

Production CENTERLESS



TYPE **614**
MEDIUM DUTY

GRINDING & FINISHING MACHINE

Remove stock faster at less cost . . .

Production's 614 Machine combines belt method of centerless grinding and finishing with exclusive reverse traverse to provide the fastest, lowest cost means of stock removal.

This medium duty machine has a capacity from ½" to 4" diameters on bar or tubular stock. Set up can be changed from heavy stock removal to low microinch finishing in minutes. Supporting and feeding fixtures are available for long lengths and various weight capacities.

Our Demonstration Laboratory is ready to process a sample lot of your parts or stock. Write for details.

PRODUCTION MACHINE CO., Greenfield, Mass., U.S.A.

Use postpaid card. Circle No. 245

Sheffield Accutron Gage Block Comparator

A new electronic gage block comparator for inspecting blocks to an accuracy capability within several millionths of an inch is announced by The Sheffield Corporation, Dayton 1, Ohio. Called the "Accutron" gage block comparator, the instrument has heavy construction for rigidity, incorporates a fine vertical adjustment designed so the indicating needle does not shift or drift when the operator's fingers are removed from the adjustment knob. As a result, the gage is said to be more easily and more precisely calibrated to the reference master.

The Accutron comparator will accommodate blocks up to 4" in length and is available with electronic amplification of either 10,000/20,000; 20,000/40,000 or 50,000/100,000 to 1. Each dual amplification can be changed from lower to higher and back again at a flip of a switch without realignment of the indicating meter mechanism.

The vertical adjustment is located in the instrument's base and raises the anvil and block to the gaging stylus. Locating it in the base eliminates the effects of leadscrew tension and of heat from the operator's hand normally encountered where the fine adjustment is in the gage head assembly.

The "Accutron" Gage Block Comparator consists of a heavy multi-rib meehanite cast base on which are mounted a removable lapped flat serrated steel anvil 5⅛" dia. x 1¾" thick, and a ground cylindrical column 2½" in diameter.

A rigid supporting bracket and gage head assembly is mounted to the column and is adjustable vertically over a range of 4" by means of a precision leadscrew and crank assembly.

Sheffield Accutron gage block comparator.

A Sheffield "Electrojet" transducer type electronic gaging cartridge in the gage head is actuated by a diamond-tipped gaging stylus. The gage cartridge is connected to a remote amplifier having a 4" zero center equilinear scale. The amplifier is unaffected by line voltage fluctuations from 65 to 150 volts. Power source is 110 volts 60 cycle A.C. The "Electrojet" requires no pickup calibration and the same unit can be used with all amplifications.

Standard gaging pressure is 8 ozs. An optional pressure attachment is available to provide gaging pressures of 2 or 4, 8, 16, and 40 ozs.

The "Accutron" Gage Block Comparator has a tapered gage head to permit full view of the block at all times, and a manual gage point lifting device to lift the gage point just enough to insert and remove the gage block without scratching it.

The gage also can be obtained with a lever-type adjustment for lowering the gaging head in increments of .0005" or .0010" over the full 4" range of vertical movement.

The Sheffield Corp., Dayton 1, Ohio.

Use postpaid card. Circle No. 110

Backstand Idler

A backstand idler specifically designed as a belt idler for grinding and polishing lathes has been announced by Fenlind Engineering Company, Rockford, Illinois. Boots and seals protect all working parts from dust, dirt, abrasive particles, etc. Known as the Fenlind L-610, its features make it adaptable to precision work with narrow belts and to heavy roughing operations.

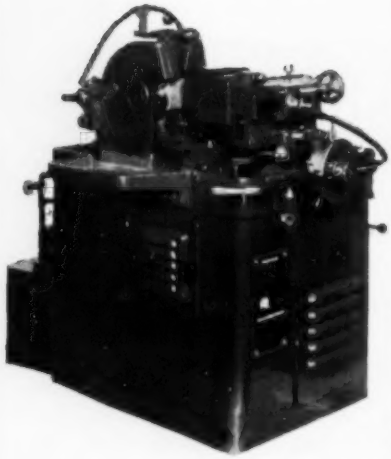
Linkages consisting of telescoping remote control arms and universal joints permit the mounting of both tracking and tension arms at any position above or on the front of the polishing lathe to suit the operator's

LOW COST GRINDERS

RIBON UNIVERSAL GRINDERS

Electro mechanical and hydraulic models produced by one of Europe's largest grinder manufacturers—completely universal with swinging internal grinding heads. 14" x 2" x 5" O.D. wheel with 3 H.P. and 18000 and 35000 I.D. spindles with 1½ H.P. Long conical adjustable plain bearings in both wheelhead and workhead with automatic pressure oil bath lubrication. All machines have automatic table traverse and infeeds.

11"x20" Electro Mechanical Grinder .....$3450.00 fob N.Y. or Chgo.
11"x32" Electro Mechanical Grinder .....$3650.00 fob N.Y. or Chgo.
11"x42" Electro Mechanical Grinder .....$3850.00 fob N.Y. or Chgo.
12"x20" Hydraulic Plunge Cut Grinder .....$5950.00 fob N.Y. or Chgo



CENTRI CENTERLESS GRINDERS

Close tolerance production units capable of .0001" tolerances in production. Long conical adjustable plain bearings on both grinding wheel and feed wheel spindles with pressure oil bath lubrication. Equipped for bar feed, thru feed, and infeed work with automatic ejectors and automatic cycling on infeed where desired. Diamond or crush dressing on both wheels with contour form and taper dressing of wheels by either hand feed screw or hydraulically.

MODEL 0 Work diameters .012"-⅝" ($1950.00 fob N.Y. or Chgo.) 10x2½x5 wheel with 2½ H.P.

MODEL 1 Work diameters .016"-2"($3450.00) 12x4x5 wheel with 7½ H.P.

MODEL 3 Work diameter .030"-3" 16x8x5 wheel with 16 H.P. Hydraulic Dressing of wheels and hydraulic automatic Variable cycling for infeed ($6475.00)

THE AMERICAN HERFORDER CORP.
1801 W. COLUMBIA AVE. CHICAGO, ILLINOIS

Use postpaid card. Circle No. 246

convenience. Belts of any length can be accommodated.

Lateral and radial adjustments of the pulley are done through a patented tracking linkage operated by a single control arm. This gives precise adjustment of the pulley for belts from ½" to 6" in width. A leather boot fits over the tracking linkage, protecting it from excessive wear.

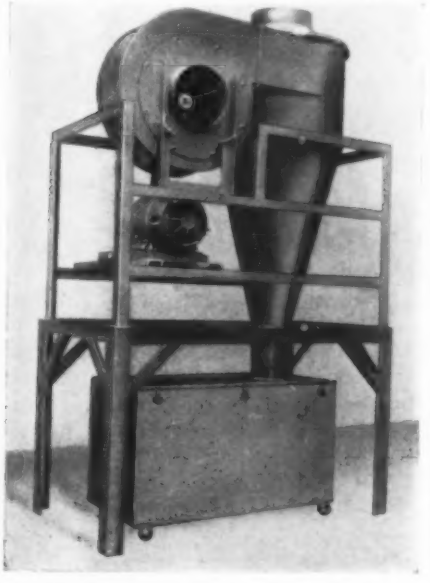
Fenlind Engineering Co., 5602 Pike Rd., Loves Park, Ill. •

Use postpaid card. Circle No. 111

Dust Collector

Aget Manufacturing Company announces a new addition to their line of dust and mist collectors. This unit, known as the 90 NB 50 is designed for use in grinding, buffing, woodworking and miscellaneous operations for handling a large volume of dust, chips, shavings and other residue.

Featured in the 90 NB 50 is a roll-away dust collecting bin, which has a storage capacity of 37½ cubic feet. This bin, of heavy reinforced cold rolled steel, moves on large rubber-tired ball bearing casters. It can be pushed to the dumping spot or it can be pulled out from under the collector where a forked lift truck can handle it. Bin top is held in place by luggage type clamps, and a flexible Neoprene coated hose runs from the cyclone outlet to the bin lid. The lid is lifted upward automatically by springs when clamps are raised.



The collector has an air handling capacity of approximately 10,000 CPM and uses a 15 H.P. motor. The fan inlet will accommodate 15" pipe. Overall dimensions are 48" deep, 82" wide by 124" high.

Aget Mfg. Co., Adrian, Mich.

Use postpaid card. Circle No. 112

New Safety Glass Frame Developed by Sellstrom

New styling, comfort and strength are said to be prime features of a "Squared Shape" metal frame for safety glasses. The manufacturer, Sellstrom Manufacturing Co., Palatine, Illinois, says greater eye protection is provided by the new frame's construction which approaches the looks of conventional spectacles.

Among the new features claimed for this frame, which is offered in the Sellstrom firm's "750 Series" safety glasses, are an improved nose bridge and rocker arm nose pads of unusual strength and impact-resistance. A wide selection of lenses and lens colors is supplied in the new frames, which is available in three standard eye sizes and four bridge sizes.

Sellstrom Manufacturing Co., Palatine, Illinois. •

Use postpaid card. Circle No. 113

All Makes • Types and Sizes High Speed
Precision Boring and Grinding (including Hi-Cycle Units)

SPINDLES REPAIRED

IN HOURS . . . NOT WEEKS!

Also Anti-Friction Live Centers Restored to Original Accuracy

Air conditioned repair center, trained mechanics and immediate availability of all types of bearings required in these units. We guarantee satisfaction and prompt service!

BEARINGS, INC.

3640 EUCLID AVENUE • CLEVELAND 15, OHIO

Branches in OHIO • INDIANA • PENNSYLVANIA
WEST VIRGINIA • NEW JERSEY • KENTUCKY

Gentlemen:
I'd like to have complete information on your spindle repair service.

Name .....
Firm .....
Address .....
City ..... Zone..... State.....

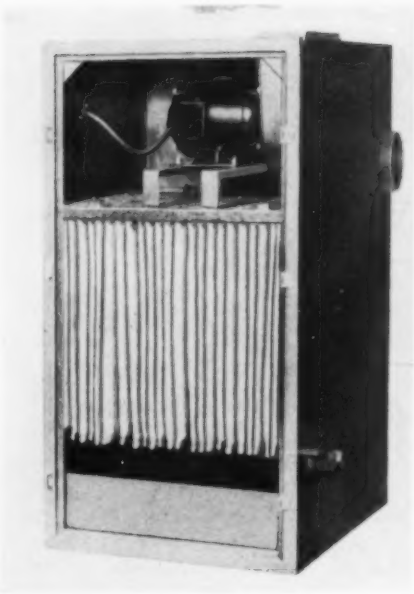
Use postpaid card. Circle No. 247

Torit Boosts Storage Capacity of Dust Collectors

All Torit "Series 80" cabinet cloth-filter dust collectors have been redesigned to permit over 2½ times more dust storage capacity. Three models—81, 83 and 84—are affected by the change, which will jump the capacity of each collector from ¾ cu. ft. to 2 cu. ft. The company reports that the change will not affect present prices.

Reason given for the new design is the popularity of these collectors on jobs producing heavy quantities of dust, chips and shavings.

Each of the collectors has 150 sq. ft. of cloth filtering area, with filters made from fine-woven cotton, chemically treated for spark resistance, and each cabinet measures 49¼" x 28¼" x 28". Internally mounted motors and fans move from 580 to 1100 c.f.m. of air through the filters at speeds of 5,000 to 8,000 f.p.m.



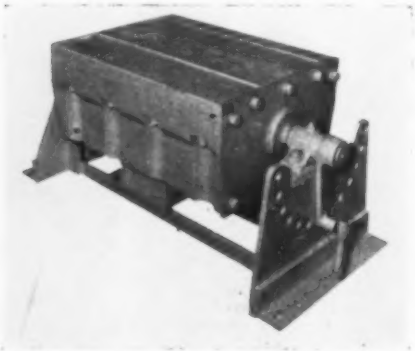
All models in the series have a manual starter with overload protection, foot pedal for shaking filters clean, solid steel cabinets and inside exhaust (where regulations permit). Explosion-proof motors and other refinements are available at extra cost.

Prices of the three units range from $398 to $448, f.o.b. factory. More details are available from Torit Mfg. Co., 287 Walnut St., St. Paul 2, Minn. •

Use postpaid card. Circle No. 114

Grinder Holding Magnets Cut Foundry Costs, Promote Safety

Savings up to 30 percent on grinding costs are claimed for foundries using Stearns Grinder Holding Magnets. Even odd-shaped castings are held securely and precisely in any position for grinding operations. Tilting models permit locking the working surface at any angle up to 30 degrees in either direction.



Powerful magnetic force grips the work firmly, requires no special blocks, clamps or dangerous makeshift holders, eliminates costly jigs and fixtures. Reduced handling of castings speeds production; positive holding promotes safety.

Stearns builds three sizes of grinder holding magnets—16 x 14 in., 16 x 24 in., 16 x 40 in.—wound for 115 or 230 volts dc with hand or foot switch.

Stearns Magnetic Products, a division of The Indiana Steel Products Co., 635 South 28th St., Milwaukee 46, Wis. Bulletin 138-C. •

Use postpaid card. Circle No. 115

Micro-Scriber Tool

Designed for die layout, scoring, etching, engraving and marking in tool rooms, machine tool repair shops, industrial plants, sheet metal shops, etc., as well as indicating service dates on production equipment and business machines. This lightweight tool, named the Micro-Scriber, can be utilized to scribe or etch all metals including hardened steel, aluminum, corrugated sheet, brass, bronze, monel, and pre-

ROYAL MASTER

Centerless Grinder

TG-12

for:

THRUFEED, INFEED, PLUNGE GRINDING

ECONOMY:

SPACE: Requires only 24" x 48" floor space.

TIME: Down to one-half setup time of nearest competitor. Converts from Thru-Feed to In-feed in minutes.

COST: Down to 50% of comparable machines. Low overhead and depreciation, due to initial economy. Low maintenance, due to simplicity and clean design. Speedy checking of work, due to accessibility of work zone to operator's both hands.

CAPACITY:

Diameters of .004" to 1½".
"Thrufeed" length of rods is 12 feet. Materials from Tungsten Carbide to Plastics - including steel and alloyed steels, non-ferrous metals, hard rubber, wood, ceramics, carbon, fiber, cork and glass.

ACCURACY:

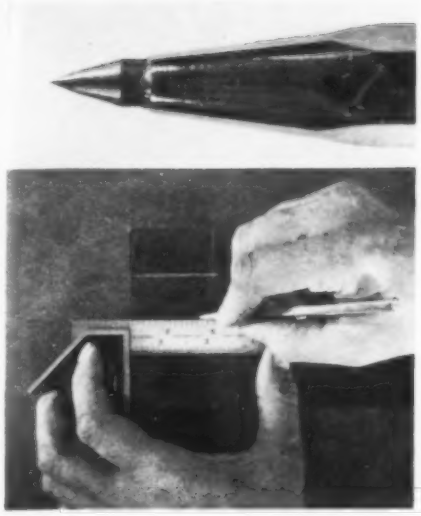
.0002" tolerance consistently held. 6 - 8 microfinishes easily obtained.

AUTOMATIC FEATURES:

Package Hydraulic Unit available to provide automatic cycling, work being hopper fed and automatically ejected. Same Package Hydraulic Unit can operate the manual combination contour and straight dressers for the Work Wheel and Regulating Wheel.

ROYAL MASTER INC.
200 STATE HIGHWAY 23, RIVERDALE, N. J.

Use postpaid card. Circle No. 248



cious gems, glass, ceramics, plastics, etc.

Solid carbide tip is diamond ground and precision lapped. This carbide tip is secured within the tool and is mounted in a polished aluminum handle, hexagonal in shape so it won't roll. Shipped 24 to a carton, list price is $1.00 per tool.

Greist Mfg. Co., New Haven 15, Conn. •

Use postpaid card. Circle No. 116

Portable Belt Unit

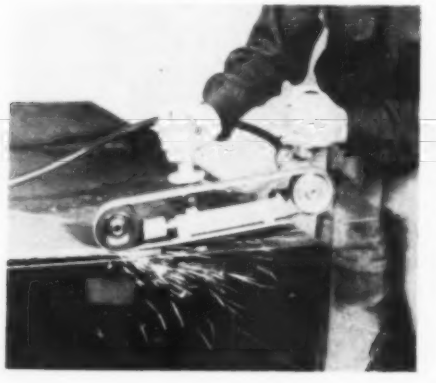
An improved portable abrasive belt unit has been announced by Grinding & Polishing Machinery Corp., Indianapolis.

The G&P 3-36 is a light weight (6¾ pounds) hand tool, that fits into a classification between hand filing and large portable wheel grinders. Tool design permits grinding on contact wheel, on the platen or slack of belt for convex surfaces. Handle positions may be changed quickly to accommodate job requirements and operator preference.

This air-motor operated tool will develop a speed of 4700 SFPM and is capable of doing in minutes the jobs that formerly took tedious hours of hand filing.

Grinding & Polishing Machinery Corp., 2530 Winthrop Ave., Indianapolis 5, Ind.

Use postpaid card. Circle No. 117

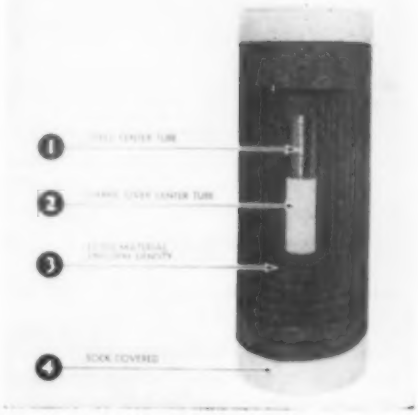


Filter Cartridge

Tuflite, a new filter material consisting of graded cotton fibers felted into sheets and impregnated with a thermo-setting plastic resin, has been introduced by Hilliard Corp. Material is not soluble in oil or water, making these filter cartridges suitable for filtering these liquids. Cartridge is designed for high flow rate and low pressure drop and removing particle sizes down to 5 microns. It is said to be suitable for fine filtration of all types of lubricating, fuel and industrial oils and many aqueous solutions such as coolant compounds.

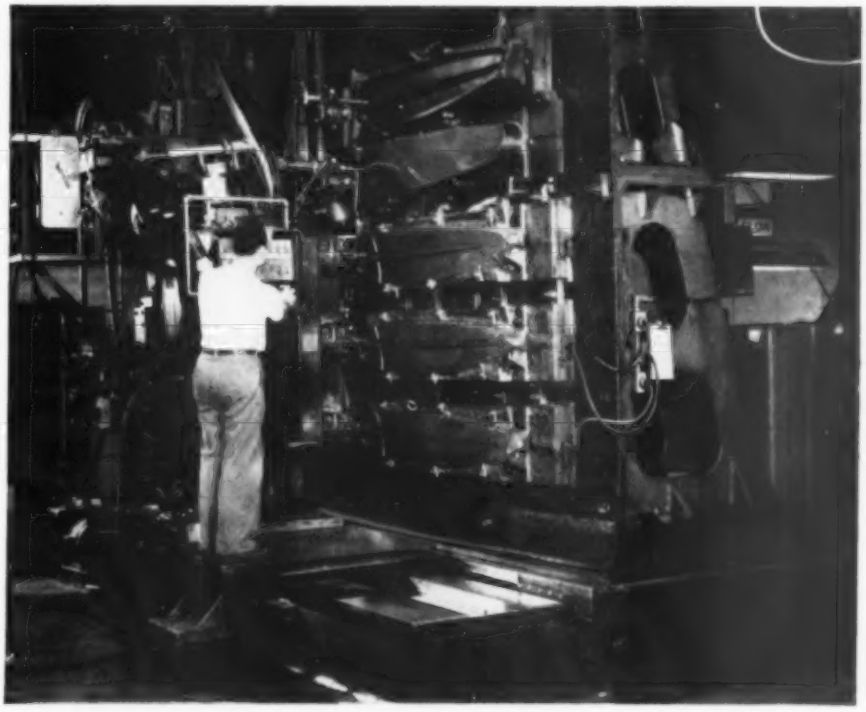
The Hilliard Corp., Elmira, N.Y. •

Use postpaid card. Circle No. 118



Hilliard Type FTC filter cartridge with Tuflite filter material.

Walker Does it Again -



Three WALKER electro-magnetic chucks mounted on milling machine, making possible profile milling three propeller blades in one operation.

WALKER engineers and makes chucks for unusual applications as well as standard holding devices for irons and steels, non-ferrous metals and non-metallic materials.

Whatever your holding problem the originators of the magnetic chuck will solve it for you.

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

IN CANADA—UPTON BRADEEN & JAMES, LTD.

Use postpaid card. Circle No. 249

Medium-Duty Coolant Pump

Self-contained in a compact unit, Model 505-T coolant pump and tank is designed for either permanent or portable coolant supply for small and medium size machine tools. It weighs only 27 pounds and can pump from 1 to 500 gallons per minute of light oil or soluble compounds to work. Heavier oils and compounds can also be used at lower gallonage.

Equipped with built-in baffle to remove chips and abrasive particles from stream of coolant through pump, tank has capacity of 6 gallons.

Standard unit operates on 115-volt, 60-cycle, single-phase current or it can be supplied for use on 230-volt, 60-cycle, single-phase current when required. Each unit is supplied with two 8-foot lengths of hose and nozzle, ready to plug in and use.

The Brady Pump Corporation, Muncie, Ind. •

Use postpaid card. Circle No. 119

Soluble Oil Mixer

The Force-Flo soluble oil mixer consists of a non-corrosive brass mixing head that has an intake for water; an intake for soluble oil; a mixing chamber and a dispensing outlet from which the soluble oil and water mixture is automatically expelled. The low-cost device is said to reduce time in mixing soluble oils.

To operate, one merely inserts the unit into a drum of soluble oil, connects the plant water line to the mixer water intake, sets a dial on the mixer head and turns on the water. As the water flows through the unit, a vacuum is created to draw oil from the drum into the mixer where it is combined with the water in the right proportion to form a uniform emulsion.

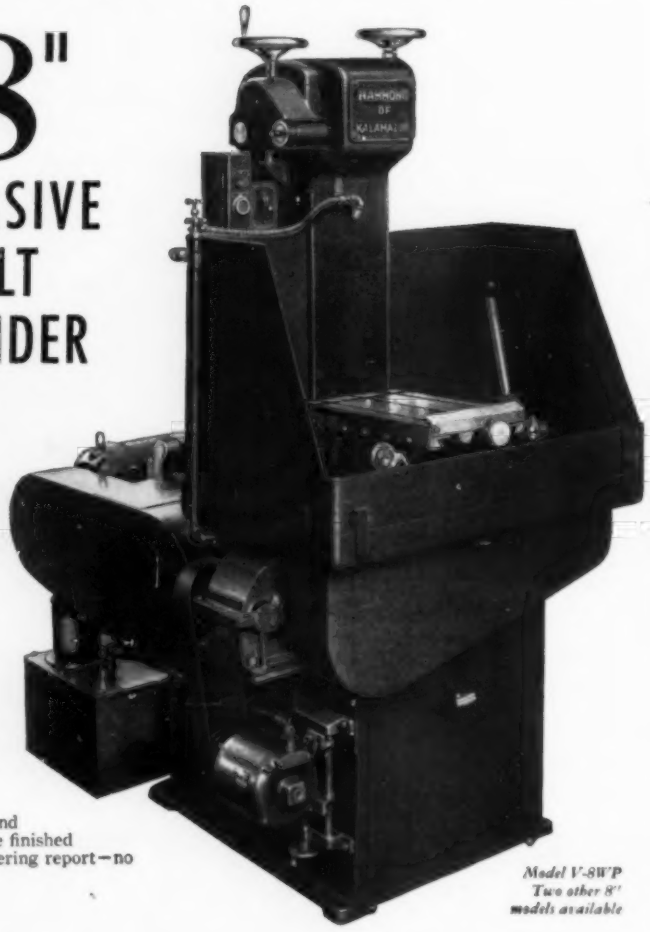
The unit has no moving parts. It is adaptable to both large and small shops. All connections have standard pipe threads. A two-inch sliding bung adapter is included with the unit to fit various drum heights including 15, 30 and 55 gallon drums.

Force-Flo, Inc., P.O. Box 2442, Cleveland 12, O. •

Use postpaid card. Circle No. 120

Hammond OF KALAMAZOO

8" ABRASIVE BELT GRINDER



Faster - Better More Economical grinding and finishing of many parts now being filed, milled, disc ground, shaped, etc. can be done on Hammond 8" Abrasive Belt Platen Grinders.

SAMPLES—Send one rough and one finished sample for engineering report—no obligation

Model V-8WP Two other 8" models available

Hammond Machinery Builders INC.

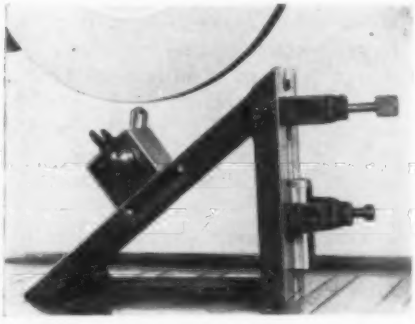
1651 DOUGLAS AVENUE • KALAMAZOO, MICHIGAN

There's a Hammond Abrasive Belt Grinder to fit YOUR need.

Use postpaid card. Circle No. 250

Adjustable Wheel Dresser

A newly introduced adjustable wheel dresser for surface grinding is said to speed the dressing operation by quickly adjusting to the working level of the grinding wheel. No longer is it necessary to move the grinding wheel itself with the fine micrometer feed, to the stationary dresser, according to the manufacturer. Both sides and face of wheel on either magnetic or non-magnetic chuck. Cost is $39.50 delivered.



Dover Machine Sales Co., 140 Dover St., Boston, Mass. •

Use postpaid card. Circle No. 121

Dual Agitator Attachment Permits Coarse and Fine Lapping

A new dual agitator tank attachment, permitting sequential coarse and fine lapping on the Model 24 Lapmaster, is now available from Crane Packing Co. It utilizes coarse abrasive in one tank and fine abrasive in the other.

In cases where lapping tolerances are not critical it is unnecessary to change laps and conditioning rings when switching from one tank to the other. Cleaning of the lap plate is all that

Dual agitator attachment for Model 24 Lapmaster.

is required. Thus, roughing to finishing and back to roughing, etc. can be maintained as one continuous operation. Not only does this effect higher production and considerable time savings, but it also substantially reduces equipment investment. One Model 24 Lapmaster with a single set of conditioning rings and one lap plate furnish a complete installation.

Where fine lapping is required, a second lap and set of conditioning rings is required. These are changed as the lapping operation is switched from coarse to fine and vice versa.

Crane Packing Co., Dept. GFN, 6400 Oakton St., Morton Grove, Ill. •

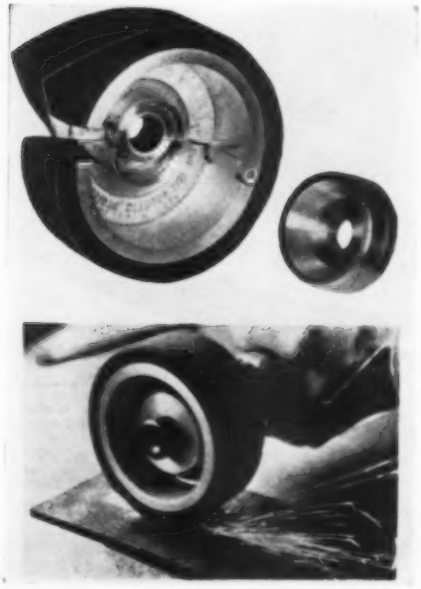
Use postpaid card. Circle No. 122

Split-Drum Wheel

A 4" diameter Cone-Loc Drum Sander is now available for grinding, buffing and polishing operations with portable high speed grinders. The wheel is a split drum sander made to accommodate ordinary strips of coated abrasives that can be torn off standard abrasive rolls. The wheel is made in only one width, 1½". It is available with arbor hole diameters of ½", ⅝" or ¾". The rubber cushion is 50 durometer neoprene rubber which will run in oil, grease or other petroleum products. Price is $25.75 postpaid and deliveries can be made at once.

American Diamond Saw Sales, 120 N. W. Ninth Ave., Portland 9, Ore. •

Use postpaid card. Circle No. 123



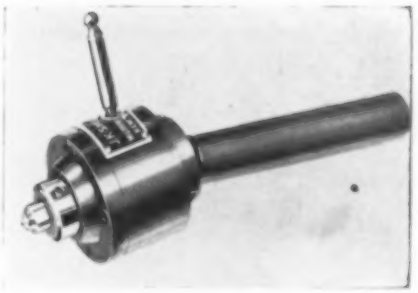
J. K. Smit Announces Mechanical Rotating Diamond Tool Holder

J. K. Smit & Sons, Inc. mfrs. of industrial diamond products announces the new "Turnit," a rotating diamond tool holder that is said to reduce diamond tool costs 50 per cent and more.

Available for either manual or automatic operation and easily installed on either external or internal grinders, the Turnit's rotating head presents a continuous new diamond edge against the grinding wheel thus reducing wheel wear, saving diamonds, giving superior work finish and eliminating diamond heat. Units are available to fit most types and models of grinders.

J. K. Smit & Sons, Inc., Murray Hill, N.J. •

Use postpaid card. Circle No. 124



R. G. haskins Co.

FLEXIBLE SHAFT MACHINES

faster Haskins machines will speed production on a big variety of metal-working jobs with their continuous speed and unerring performance. And there's no need to worry about changing tools—it takes just seconds to switch to any one of the numerous metal-working attachments in the Haskins line. *Use Haskins equipment and eliminate interruptions.*

easier Haskins flexible shaft machines make the whole operation a simple matter. They're portable—ready to go to work in whatever spot you choose, even remote sections of your plant. Operators say Haskins machines are easy to use because they have to hold only the lightweight handpiece which permits greater accuracy for close, precision work. You should know about Haskins flexible shaft machines and accessories-*leaders in their field for over 30 years.*

Write Today for a Catalog and Literature

HASKINS

R. G. HASKINS Co.

2649 West Harrison Street Chicago 12, Illinois

Use postpaid card. Circle No. 251

Relief Grinder

The new Steptool relief grinding fixture is a simple and highly efficient cam actuated device for the relief grinding of step drills, countersinks, taps, etc. Operators can be trained in 10 minutes. This device uses a single solid cam for adjustment of clearance lift. Index hubs contain indexes for different numbers of flutes, which can be slipped on or off in a matter of seconds. Extended spindle in rear permits addition of pulley to motorize; uses 5 C collets; has a rugged base graduated to 360°. Spindle locks with twist of the wrist; weighs 26 pounds.

Steptool Co., 3613 E. Olympic Blvd., Los Angeles 23, Calif. •

Use postpaid card. Circle No. 125

Metal Cleaning Slusher

Cleaning of metal parts without hand labor is afforded by a motor driven slusher developed by Belke Manufacturing Co., Chicago.

Material for cleaning is suspended in the cleaning or rinsing solution on a horizontal rod which moves on an arc.

The parts move up and down also sidewise through the solution producing a slushing action. Parts may be suspended on plating racks, in baskets or on wires.

Electrical connection for electrical cleaning can be furnished.

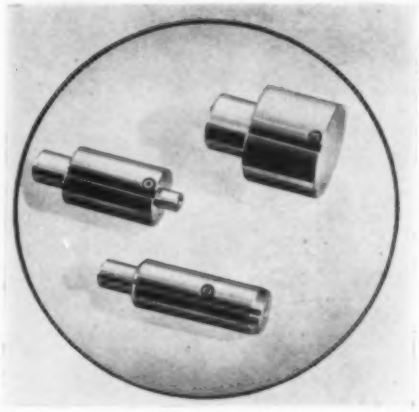
The improved slusher is available complete with tank or can be furnished to fit present tanks. Drive motor is ¼ HP, available for single or three phase. Literature on request.

Belke Mfg. Co., 9440 Cicero Ave., Chicago 51, Ill. •

Use postpaid card. Circle No. 126

Air Gage Spindles Offered by Dearborn

Stock delivery of air gage spindles for any standard air gage instrument, regardless of make or model, is announced by the Air Gage Division, Dearborn Gage Co., Dearborn, Mich., manufacturer of Dearbornaire column-type gage instruments and accessories.



Air gage spindles.

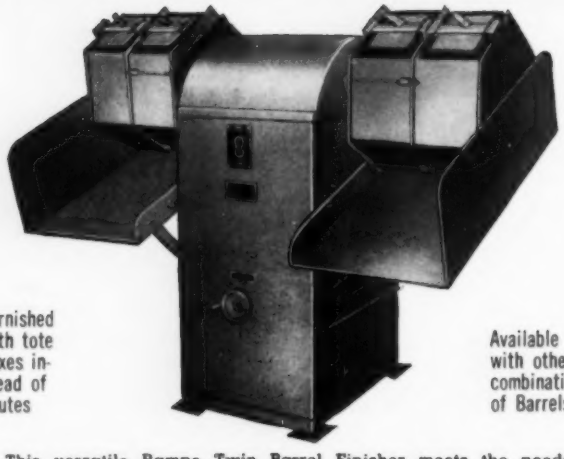
Spindles are available in steel, chromium and carbide, in through-hole, counterbore and blind types, and in sizes ranging from 0.275 to 3 inches in diameter. •

Use postpaid card. Circle No. 127

Gage Checks Roll Dimensions

Gage for checking roll dimensions is available from A. G. Davis Gage & Eng. Co. Davis "Roll-Chek" gage answers the need for a fast positive method of checking difficult to gage roll dimensions. Davis Roll-Chek has

MULTIPLE BARREL FINISHER
Services Many Small Loads



Furnished with tote boxes instead of chutes

Available with other combinations of Barrels.

This versatile Rampe Twin Barrel Finisher meets the needs of the plants with many small loads to be tumbled.

As illustrated, the machine is equipped with four 5-gallon barrels. Other combinations of barrels are available.

Motor is ½ H.P. 220/440 volts, 3-phase.
Variable Speed Drive from 12 to 36 RPM.
Watertight switch and magnetic starter.

Barrels can be furnished with No Seam Vinyl Plastic lining, if desired.

Write for complete information and latest catalog.

RAMPE MANUFACTURING CO.
14915 WOODWORTH AVE., CLEVELAND 10, OHIO

BARREL FINISHERS • SCREEN SEPARATORS • COMPOUNDS • NYLASLUGS

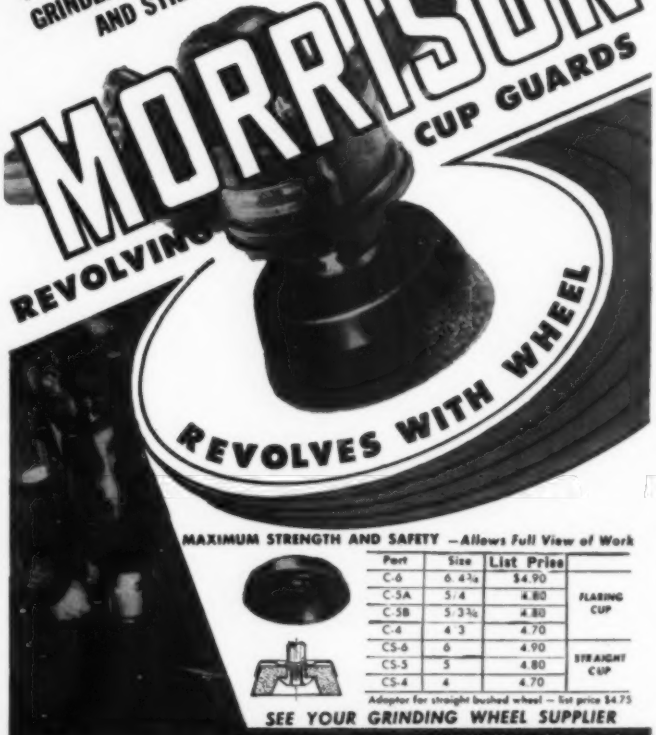
Use postpaid card. Circle No. 252

LATEST DEVELOPMENT IN WHEEL GUARDS...FOR PORTABLE GRINDERS WHEN USING FLARING CUP AND STRAIGHT CUP WHEELS...

MORRISON CUP GUARDS

REVOLVING

REVOLVES WITH WHEEL



MAXIMUM STRENGTH AND SAFETY —*Allows Full View of Work*

Part	Size	List Price	
C-6	6 4¾	$4.90	FLARING CUP
C-5A	5 4	4.80	
C-5B	5 3¾	4.80	
C-4	4 3	4.70	
CS-6	6	4.90	STRAIGHT CUP
CS-5	5	4.80	
CS-4	4	4.70	

Adaptor for straight bushed wheel — list price $4.75

SEE YOUR GRINDING WHEEL SUPPLIER

MORRISON PRODUCTS INC. • 16816 Waterloo Road Cleveland 10, Ohio

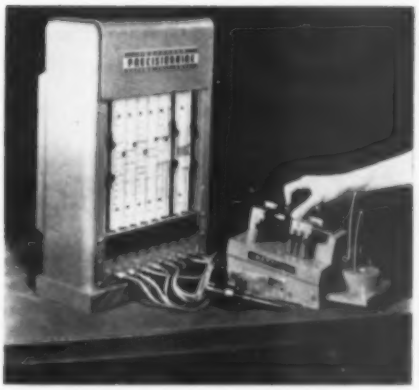
Use postpaid card. Circle No. 253

proven valuable for tool room use in grinding rool dimensions fast and accurately. A. G. Davis Gage & Eng. Co., 21435 Dequindre, Dept. F67, Hazel Park, Mich. •

Use postpaid card. Circle No. 128

A NEW THREE-STAGE Precisionaire gage manufactured by The Sheffield Corporation checks 4 O.D.'s simultaneously, taper, throw diameter and throw dimension on the crankshaft of a compressor unit for air conditioners at a rate of 350 to 400 parts per hour. The gage consists of a compact bench-type work holding and locating device with Vee type blocks, an auxiliary bottom-type Air Ring, a hand-type Airsnap, and an 8 column Precisionaire.

To use: The operator loads the part onto the tungsten carbide Vee locators to inspect the 4 O.D.'s; then rotates the part to pickup throw dimension and completes this phase of the gaging cycle by inspecting throw diameter with the hand-type Airsnap. Rotating the part also indicates any out-of-roundness of diameters. The position of the floats in air columns Nos. 1 thru 6 indicate whether each dimension is in tolerance or the amount it is out of tolerance. Actual size may be read on the linear scales. Throw dimension is indicated by the



highest position of the float as the part is rotated past a Plunjet gaging cartridge. To check taper, the end of the crankshaft is inserted into the bottom-type chrome-plated Air Ring and rotated, with taper being indicated by comparison of float positions in air columns 7 and 8.

Use postpaid card. Circle No. 131

Fibreglass-Reinforced Cut-Off Wheels and Depressed-Center Discs

Two new fibreglass-reinforced resinoid grinding wheels, said to have superior strength, have been introduced by Electro Refractories & Abrasives Corp. after two years of research and field testing.

One is a foundry cut-off wheel available in diameters up to 20 inches. The other is a depressed center type wheel that comes in seven and nine-inch diameters.

The cut-off wheel can be used on steel alloys and non-ferrous castings for tuck pointing, masonry cutting, concrete slotting, wire cable cutting and general purpose cut-off work.

Designed for grinding normally hard to get at spots with portable units, the depressed center reinforced wheel has many applications. It can notch castings risers for knock-off, deburr, slot, clean welds and perform light snagging and clean up operations on fabricated steel structures. •

Use postpaid card. Circle No. 129

Square Master Angle Plate

Federal Square Master Plate has been introduced by Federal Machine Tool Co., Bristol, Conn. Said to be a time saver in grinding workpieces square, the Square Master is used in jig, fixture, die and gage work, and is said to eliminate use of indicator, precision square and surface plate. All working surfaces are guaranteed to be within .0002-in. squareness. Diamond mounting hole permits dressing of wheel without removing workpiece. It also allows dressing to approximate height of grinding operation. •

Use postpaid card. Circle No. 130

In checking with the tool, die, gage and general production shops that use SANFORD SURFACE GRINDERS, the most frequent comment was that Sanford Grinders were the "most used" of any grinders in the shop.

Others have tried to copy but there's a "feel" that comes from the precise individual quality and workmanship that goes into every SANFORD GRINDER. It's the factor that can't be found in any other grinder.

So widely used you can ask users in your own area how they like the low priced Sanford Surface Grinder.

PARTIAL SPECIFICATIONS—

Capacity — 8" x 12" x 12".
Table travel — 13", traverse 8¾".
Vertical clearance 12" under 7" wheel.
Standard grinding wheel — 7" x ½", 1¼" hole.
Spindle speed approx. 3000 RPM.
Motor, ½ HP, single or 3 ph., dynamically balanced.
Floor space — 45" x 38" x 62" high.
Net wt. with stand approx. 630 lbs.

Write for illustrated and fully descriptive literature, reconditioning facilities, optional equipment and prices.

Representatives in major industrial areas

SANFORD MANUFACTURING CORP.
1026G Commerce Ave., Union, N. J.

Use postpaid card. Circle No. 234

News of the Industry

Canadian Aircraft Firm Wins Award on Savings In Parts Finishing Program

Savings of 97% over previous deburring and finishing costs have won an Almco Supersheen award for Canadian Pratt and Whitney Aircraft Company, Ltd. of Montreal, it has been announced.

The award—a $50 check and certificate—was made by Almco of Albert Lea, Minnesota, manufacturer of barrel finishing equipment and compounds. Basis of the award was a $2,430 annual savings on spark plug bushings used in the Canadian Pratt and Whitney aircraft engine.

The previous cost figure of $104.20 per thousand bushings finished on speed lathes and portable power tools was cut to $2.95 per thousand under

APEX
DISC GRINDER

BRINGS YOU NEW HIGH SPEED HEAVY PRODUCTION AT LOW INITIAL COST

A popular disc grinder that incorporates features wanted most by industry. Table moves up and down, tilts accurately and squares automatically. Wrap-over guard tilts back to handle work at top of disc. Available in three disc sizes, 15", 16", 20" Specifically engineered to handle heavy production schedules at high speed with extreme accuracy. Economically priced. Write today for complete information and name of distributor nearest you.

Dealer Inquiries Invited

Rankin Bros.
ENGINEERING & SALES, INC.
11090 S. ALAMEDA ST. LYNWOOD, CALIF.

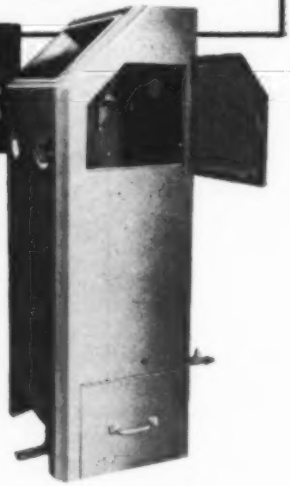
Use postpaid card. Circle No. 255

Save with Sandblasting!

Do all these operations better, faster, at lower cost with

- Cleaning metal surfaces, molds, dies, tools
- Removing burrs, scale, carbon, rust, paint
- Preparing surfaces for plating and finishing
- Producing satin and matte finishes
- Stenciling, lettering, trademarks

Cabinet Type
LEIMAN SANDBLASTS



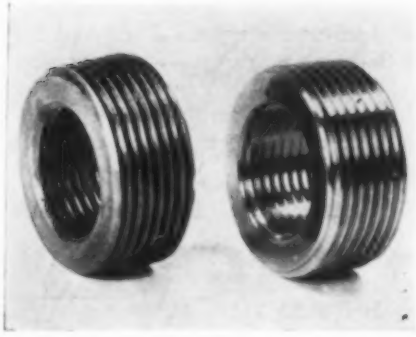
Whether you work on metal, glass, plastics, compositions . . . whether on production runs or single pieces, large or small—you'll find countless uses for versatile Leiman Sandblasts. Easily operated by unskilled help. Require little floor space. Use all types of abrasives. Well-designed, rugged, priced right, last for years.

Send for informative bulletin "Sandblasting", plus catalog showing complete line.

LEIMAN BROS., Inc.
109 Christie St., Newark 5, N. J.

Use postpaid card. Circle No. 256

WINNER OF ALMCO AWARD, Maurice Harrison, Supervisor of Process Planning at Canadian Pratt and Whitney Aircraft Co., Ltd. of Montreal, shows threaded spark plug bushing on which his company will save $2,430 annually by using controlled processing with modern barrel finishing equipment.



BEFORE AND AFTER view of spark plug bushings processed with Almco equipment. Highly polished bushing at right has been deburred and polished in an Almco Model DB-200 barrel finishing machine.

the new program.

Details of the report also cite important product quality gains. The non-uniformity of parts finished by manual methods accounted for a 12½% reject rate. Job reports submitted after converting to modern barrel finishing equipment showed a virtual elimination of rejects.

Equipment used by Canadian Pratt and Whitney in winning the Almco award included two DB-200 units with capacity for deburring and finishing 1,000 spark plug bushings in 45 minutes. •

Ronan to Texas Co. Regional Post

R. J. Ronan has been appointed Regional Manager-Technical Services of the Texas Company, with headquarters in Beacon, N.Y., home of the Texaco Research Center. Mr. Ronan is in charge of technical services for industries in 14 Eastern and Middle Atlantic States.

Creation of the new regional office will make the company's technical services more readily available to industries in the 14-state area. •

Dever Named to Top Post At Honeywell

Henry F. Dever, president of Brown Instruments Division of Minneapolis-Honeywell, has been given corporate responsibility for directing the parent company's activities in the industrial controls field, Paul B. Wishart, president of Honeywell announced recently.

The new assignment, Wishart said, is in recognition of the great potential for growth existing in producing automatic controls and industrial instruments for industry. This must be done to keep pace with such technological advances as electronics, atomic energy and the mushrooming of automation throughout all of industry, he added. •

Krohn Named Norton Field Engineer

Frank W. Krohn has been appointed a Field Engineer by Norton Company and assigned to its Detroit district office.

Mr. Krohn, a graduate of Brown University, recently completed Norton's sales training course and prior to his present appointment, was a member of the sales engineering department. He is a native of West Hartford, Connecticut, the son of Mr. and Mrs. Bertil W. Krohn of 1 Colton Road in that city. •

WE MANUFACTURE

- Speed Lathes
- Portable Grinders
- Tool Post Grinders
- Abrasive Cut-off Machines
- Bench and Pedestal Buffers
- Air Master Dust Collectors
- Bench and Pedestal Grinders

CHECK THESE ADVANTAGES

1. *Rugged* Motors (¾ H.P. to 10 H.P.)
2. *Rugged* nickel-steel spindle with shaft-locking device
3. *Rugged* wheel guards with exhaust connections
4. *Rugged* grinding rests adjustable to wheel wear and height
5. *Rugged* pedestal built in proportion to horsepower and grinding wheel requirements

Write now for Catalog

TRADE The Cincinnati MARK

THE CINCINNATI ELECTRICAL TOOL CO.

314 Mt. Hope Ave. • Cincinnati 4, Ohio

Use postpaid card. Circle No. 257

DTR DIAMONDS ON TELEVISION—The current spate of news stories on diamonds indicates that public and technical interest in diamond products has reached a new high. In this connection, Will Rogers Jr. recently invited Diamond Tool Research Company to participate in his television show. The technician in the picture above left is demonstrating diamond crushing, done with a heavy hammer in the steel mortar and pestle illustrated. Also shown is a diamond saw with the saw blade (.003" thick) in the center. Sawing is done across the grain of the stone. Above right, Mr. Rogers watches the specialist prepare to cleave a diamond. Cleaving is done along the grain lines, similar to splitting kindling wood.

Abrasive Appoints Works Manager

Edward H. Jacobs has been appointed Works Manager of Abrasive Machine Tool Company, East Providence, Rhode Island. In making the announcement, N. Douglas MacLeod, Jr., Executive Vice-President, pointed out that Mr. Jacobs' chief responsibility will be supervision of production of the Company's broad line of precision surface grinders.

A graduate of Worcester Polytechnical Institute, Mr. Jacobs received his B. S. degree in Mechanical Engineering in 1942. His past experience has included test, design and project engineering in the aircraft engine and ordnance industries. •

contur

COATED ABRASIVE DISCS AND LOCKING HOLDERS

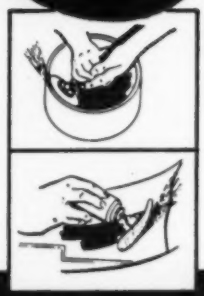
ON OR OFF WITH A TWIST OF THE WRIST

INSTANT BAYONET LOCKING . . .
SELF CENTERING . . .
Cannot loosen from heat caused by friction.

Ideal for grinding and polishing all surfaces, flat to extreme inside or outside contours.

"H-Flex" Holders are used where more extreme flexibility is needed . . . Flexibility is adjustable to job.

Write for brochure



FOSTER SUPPLIES CO.

6122 Milwaukee Ave. • Dept. GF • Chicago 30, Illinois

Use postpaid card. Circle No. 258

FS TM REG

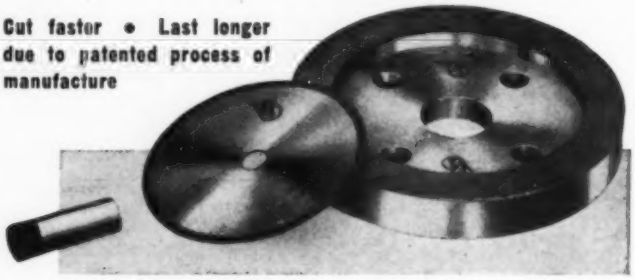
STEELSET

SINTERED STEEL BOND

Diamond Wheels

(FOR WET GRINDING)

Cut faster • Last longer due to patented process of manufacture



Announcing:

ALUMINUM BODIES AT NO INCREASE IN PRICE
—for lightness, strength and dimensional stability. Available on most specifications of peripheral, cup and dish-shaped wheels.

NEW BOND MODIFICATION
—for improved non-glazing characteristics.

CUT-OFF BLADES UP TO 8 INCHES in diameter
Drills, blades, hones, lens laps, center laps etc.

We specialize in non-standard requirements. Send us your prints for quotation.

ATTRACTIVE PRICES • FAST DELIVERY

Write for Catalog DT 353

Fish-Schurman Corp., 81 Portman Road, New Rochelle, N.Y.

Use postpaid card. Circle No. 259

1000TH SHEFFIELD JET BLADE GAGE DELIVERED—Marking a significant milestone in jet engine quality control, Sheffield Corporation has delivered the 1000th "Precisionaire" column air gage for multiple measurement of jet blade contours. Here William I. Wilt, general manager of Sheffield's Standard Production Instruments division, left; and Louis Polk, Sheffield president and chairman, give a "final inspection" to jet blade gage Number 1000.

Micromatic Moves Chicago Office

Micromatic Hone Corp. announces the establishment of its Micro-Mold Manufacturing Division, dealing in all its abrasive supplies and coolants, in Sycamore, Ill., effective October 1, 1956.

Offices and warehousing facilities which were formerly in Evanston, Illinois, are being transferred to the Sycamore address, including Micromatic district sales and service staffs.

The new address is given as: Micromatic Hone Corp., Micro-Mold Manufacturing Division, 202 Lucas St., Sycamore, Illinois. Phone 2131.

As in the past, the company's Detroit headquarters will handle details pertaining to manufacture of equipment such as machinery and tools. •

Norton Plant Addition

Construction on a new 2 million dollar, two story, Central Service Building will begin October 1 at Norton Company's Worcester, Massachusetts plant. The completely modern three and a half acre factory and office building will centralize under one roof the plants engineering department and a variety of crafts which service the entire plant. Also included in the new building will be a cafeteria with seating capacity for 600 people and a new central commissary where food will be prepared for serving at the company's six cafeterias. The building will be located on New Bond Street, adjacent to the present factory service building, which will be taken over by the Stores Department when it is vacated.

The Norton Company plants engineering department, headed by Allan F. Hardy, Jr., of Holden, prepared the building layout and overall design.

THE
WALTER AMS 1000 Cutter Grinder

VERSATILE
AUTOMATIC
CENTRALIZED CONTROLS

. . . solve your most complex cutter grinding problems . . . New, modernized electro-hydraulic, infinitely variable speeds. Grind carbide or high-speed steel. Single setup can grind complicated side and face staggered teeth with radius corners and negative face lands. WALTER AMS 1000 sets the standard for best precision grinding of mill cutters.

Grinds right and left hand milling cutters of from 4" to 40" diameter.

Write today for complete details:

CARL hirschmann CO., INC. MANHASSET, N.Y.

LOS ANGELES • CHICAGO • DETROIT
IN CANADA: CARL HIRSCHMANN COMPANY OF CANADA, LTD.
5133 DUNDAS ST. WEST, TORONTO, ONT. • BELMONT 3-6091
largest selection of high-precision machine-tools in the United States and Canada

Use postpaid card. Circle No. 260

PRESSURE LOK® - 224

RESINOID DIAMOND WHEELS

— the best diamond wheel bond ever developed —
if you've used them - you know they're best!
if you haven't - let us show you!

UNITED STATES DIAMOND WHEEL CO. AURORA, ILL.

Use postpaid card. Circle No. 261

ACCURACY .0002 T.I.R.

.0002 T.I.R. OR LESS AT SPINDLE NOSE, .0005 T.I.R. OR LESS ON TEST ARBOR SIX INCHES FROM SPINDLE NOSE

SPINDLE SPEEDS 150 and 250 RPM Other Spindle Speed Pulleys Available

MODEL B943 MOTOR DRIVEN WORK HEAD

No. 11 B & S Tapered Spindle Standard Equipment. No. 12 B & S or No. 5 Morse Available at Slight Extra Cost. Same Accuracy Guaranteed!

The B943 Motor Driven Work Head is a compact self-contained power unit for internal and external grinding. It is held in position by two T-slot bolts and can be mounted at any convenient spot on the table. The swivel base, which is graduated 90° one side of center and 45° on the other, permits the Work Head to swivel full 360° if desired. Swivel base can be easily removed from head permitting units to be mounted on table without base if desired. The B943 is easily and quickly mounted on other makes of grinders.

The No. 11 B&S tapered spindle, mounted on ball bearings, is hardened and ground, and is designed to receive chucks, collet fixtures, face plates, straight or tapered sleeves, centers and like equipment. Unit is grease packed at factory and requires no service in the field for the life of the bearings. Streamlined in design, this fixture is quickly mounted and is easy for the operator to keep clean.

The special motor is provided with conveniently located reversing switch which is handy for the operator regardless of the position of the work table or rotation of the work. Motor operates quietly and is fully protected from dust and from any oil entering from working parts.

See this extremely accurate B943 work head at your equipment dealer or write for complete literature.

K. O. LEE COMPANY

ABERDEEN, SOUTH DAKOTA

Use postpaid card. Circle No. 262

GRINDING and FINISHING

DISTRICT MANAGERS

EASTERN DIVISION

Dan E. Reardon, V.P.
Box No. 1, South Glastonbury, Conn.
Telephone: MEdford 3-7083
or
c/o Hitchcock Publishing Co.
55 West 42nd Street
New York 36, N.Y.
Telephone: LAckawanna 4-4528

NEW ENGLAND—CONN., MASS., R.I., ME., N.H. & VT.
John Pickering, Jr.
592 Osgood St.
North Andover, Massachusetts
Telephone: MUrdock 8-0913

NEW YORK METROPOLITAN AREA
H. George Burnley
c/o Hitchcock Publishing Co.
55 West 42nd Street
New York 36, N.Y.
Telephone: Lackawanna 4-4528

EASTERN PENNA., EASTERN N.Y. STATE, N.J., MD., DELA., D. of C.
H. George Burnley
c/o Hitchcock Publishing Co.
55 West 42nd Street
New York 36, N.Y.
Telephone: LAckawanna 4-4528
Home Address: Saddle River, N.J.

CENTRAL DIVISION

SOUTHERN COOK COUNTY and ILLINOIS, SOUTHWESTERN OHIO, SOUTHERN IND.
Henry J. Smith, V.P.
c/o Hitchcock Publishing Co.
222 East Willow Avenue
Wheaton, Illinois
Telephone: WHeaton 8-3400

MICHIGAN, NORTHERN IND., NORTHWESTERN OHIO.
William E. Jacobs
c/o Hitchcock Publishing Co.
18055 James Couzens Highway
Detroit 35, Michigan
Telephone: Diamond 1-9525

NORTHERN ILL., NORTHERN COOK COUNTY, WISC., MINN., UPPER PENINSULA of MICH., & S. DAKOTA
Robert G. Bolinder
c/o Hitchcock Publishing Co.
222 East Willow Avenue
Wheaton, Illinois
Telephone: WHeaton 8-3400

WESTERN NEW YORK STATE, WESTERN PENNA., EASTERN OHIO
Ralph E. Helfrick
1507 Edgefield Road
Cleveland 24, Ohio
Telephone: HIllcrest 2-0189

WESTERN DIVISION

CALIFORNIA, ARIZONA
Keith H. Evans
3723 Wilshire Boulevard
Los Angeles 5, California
Telephone: DUnkirk 8-2981
and: 593 Market St. (Room 816)
San Francisco 5, Calif.
Telephone: YUkon 2-4280

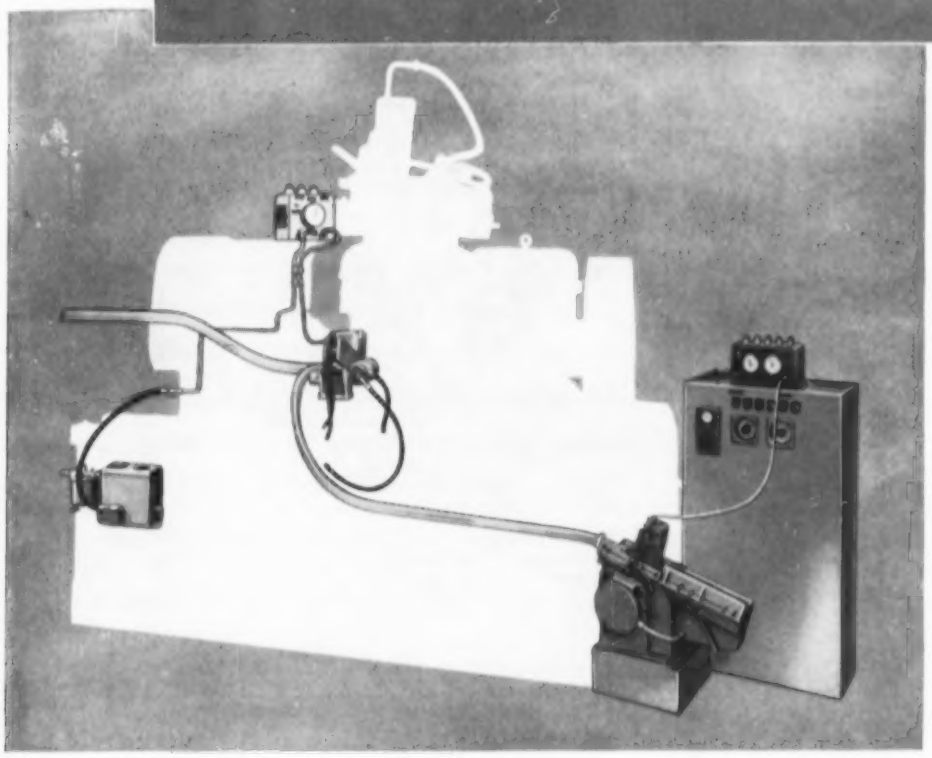
OREGON, WASHINGTON
Lloyd Thorpe
531 Medical Arts Building
Seattle 1, Washington
Telephone: Main 6827

HITCHCOCK PUBLISHING CO.

Telephone WHeaton 8-3400

Wheaton, Illinois

In AUTOMATION Gaging too,



FEDERAL goes the whole way

Combined gaging permits close control of work size over long periods of time. To compensate for drift, etc., gage on the machine shifts its control point at the command of the after-gage (lower right) which originates signal when a prescribed number of pieces has exceeded marginal limits.

If you're ready to talk about . . .

Control on the Machine • Control after the Machine Combined Gaging • Control for Non-Reference Variation • Control of Size for Predetermined Fit Continuous Process Control • Control Point Compensation • Flagging Gages • Chute Gages • or other types and methods of automation gaging—

It's easy to look upon Automation as the answer to every production problem. Being the first to treat Automatic Gaging so fully, however, we are well aware how helpful experienced advice can be in avoiding the mistakes and disappointments which often occur when complete automation is undertaken with **insufficient knowledge and too hasty planning.**

Close cooperation with machine tool builders has enabled us to successfully develop gages that conform to the capabilities of their machines. Our engineers provide various degrees of control on existing machines in the field and also work in close collaboration with machine designers to provide gaging and control units built into the manufacturer's original machines.

Many highly successful installations in daily operation demonstrate our practical knowledge in this field of gaging. We will welcome the opportunity to discuss your proposed automation when you first start your preliminary planning.

Our goal is the development of the one best automation gage for your job using mechanical, air, electric, or electronic gaging systems, whichever suits your needs best. Write or call us today.

FEDERAL PRODUCTS CORPORATION
7441 Eddy Street • Providence 1, R. I.

FEDERAL'S SOLUTION TO THE COST OF GAGING:
Impartial Gage Selection
Engineering Follow-Through
Everything in Gages

Ask for your copies of our new Automation Catalog 56 AM and Supplement. Full of valuable ideas — they're important reference books.

Ask FEDERAL First

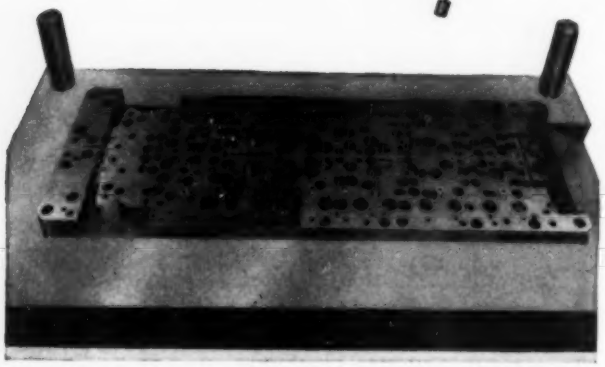
FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging

Use postpaid card. Circle No. 266

HOLES
JIG GROUND with
Vulcanaire

Provide yourself with this inexpensive* instrument for use on your present equipment and JIG GRIND with a guarantee.



A seven station die from Vulcan's contract Tool Room (Your Tool Room in Dayton).

Standard sized punches and buttons were used. But since forming and piercing operations were involved, hardening of the sections was necessary followed by JIG GRINDING. Result: Close tolerances held easily and perfect progression throughout — another satisfied customer.

*Vulcanaire equipment pays for itself on the first job.

Borrow Vulcan's instructive movie on jig grinding

SERVICES OF

YOUR TOOL ROOM in DAYTON

Engineering, Processing, Designing . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and Size . . . Vulcanaire Grinding Heads . . . Motorized Rotary Tables . . . Plastic Tooling . . . Vulcanaire Jig Grinders.

VULCAN TOOL CO.

743 LORAIN AVE. DAYTON 10, OHIO

Use postpaid card. Circle No. 263

Index to Advertisers and Products

(With a List of Their Advertising Agencies)

A

Acme Scientific Company (Diamond Compounds) 50
Turner Advtg. Agency

Aer-O-Matic Tool Company (Wheel Dressers) 56

Aget Manufacturing Company (Dust Collectors) 50
Slayton-Racine, Inc.

Almco Division, Queen Stove Works (Barrel Finishing Equipment) 57
Alfred Colle

American Herforder Corporation (Universal Grinders) 72

American Standard Company (Angle Wheel Dressers) 48

Anderson, F. E. Oil Company, Inc. (Coolants & Lubricants) 68
Peck-Adams Inc.

Barnes Drill Company (Magnetic Coolant Separator) 9
Wendall C. Galloway

Bay State Abrasive Products Company (Grinding Wheels) 34, 35
Berg-Marshall Inc.

Bearings, Incorporated (Spindle Repair Service) 73
Brad Wright Smith Advertising, Inc.

Behr-Manning Corporation (Abrasive Belts) 16A
J. M. Mathes Incorporated

Blanchard Machine Company (Grinding Wheels) 53
Henry A. Loudon Advertising

Buckeye Tools Corporation (Portable Grinders & Buffers) 59
Industrial Advertising Service

Chicago Wheel & Manufacturing Company (Mounted Wheels, Slide Abradors) 49
Frank C. Nahser Inc.

Cincinnati Electrical Tool Company, The (Grinding Machines) 81
Dinnerman & Company

Cincinnati Milling Machine Company (Grinding Machines) 2, 3
Jaap Orr Advertising Agency

Cincinnati Milling Machine, Grinding Wheels Division (Grinding Wheels) 45
Ralph H. Jones Company

Cleveland Grinding Machines Company (Grinding Machines) 4
Gerst, Sylvester & Walsh, Inc.

Clipper Diamond Tool Company, Inc. (Diamond Tools & Wheels) 68
Harry Hurst Advertising

Crane Packing Company (Portable Polishing Stands) 60

Crystal Lake Grinders (Grinding Machines) 87

Electro Refractories & Abrasives Corporation (Grinding Wheels) 67
Tyler Kay Company

Engelberg-Huller Inc. (Abrasive Belt Grinders) 64
Barlow Advertising Inc.

Esbec Barrel Finishing Corporation (Barrel Finishing Equipment) 62
PS Advertising Inc.

Federal Products Corporation (Gages) 85
Horton-Church & Goff Company

Fish-Schurman Corporation (Diamond Wheels) 82
John O. Powers Company

Foster Supplies Company (Coated Abrasive Discs) 82
Munger-Spens Advtg.

Gallmeyer & Livingston Company (Grinding Machines) 88
Van Stee, Schmidt & Sefton Advertising

Grav-I-Flo Corporation (Spin Finishing Equipment) 16
Paul A. Fergus Company

Hammond Machinery Builders Incorporated (Abrasive Belt Grinders) 76
Stevens Incorporated

Hanchett Magna-Lock Corporation (Magnetic Chucks) 12
Paxson Advertising Agency

Hartford Steel Ball Company (Tumbling Barrels) 43
F. E. Prelle Company

Haskins, R. G. Company (Flexible Shaft Machines) 77
Lester L. Jacobs, Inc.

Hill-Acme Corporation (Surface Grinders) 16D
Osborn Bartlett & Associates

Hirschmann, Carl Company, Inc. (Grinding Machines) 83
Malcolm W. McClellan Advertising

Hoffman Brothers Drilling Company (Diamond Laboratory Bits) 62
Hewitt Advertising

Industrial Filtration Company (Tubular Screen Filters) 55
Drennan, W. Hart & Company

J & S Tool Company, Inc. (Wheel Dressers) 70
Gordon A. Pihl & Associates

Jeon Manufacturing Company (Dressing Tools) 62

Kramer, H. W. Company (Tumbling Barrels & Buffing Lathes) 56
Mitchell Advertising Agency

Kuzmick Company, The Paul L. (Diamond Wheels) 61

Lassy Tool Company (Angle Plates) 65
The Walker-Rackliff Advertising Company

Lee, K. O. Company (Motor Driven Work Heads) 84
Acme Advertising Agency

Leiman Brothers, Inc. (Sand Blast Equipment) 80
Thoma & Gill

M-B Products (Pneumatic Grinders) 64
Dudgeon, Taylor & Bruske, Inc.

Manhattan Rubber Division, Raybestos-Manhattan Inc. (Portable Abrasive Wheels) 5
Roland G. E. Ullman Organization

Morrison Products Incorporated (Revolving Cup Guards) 78
Baker & Baker & Associates, Inc.

Murray-Way Corporation (Polishing Equipment) 69
F. B. Hubert Advertising Counselors

Norton Company, The (Grinding Wheels) .....16B, C
James Thomas Chirurg Advertising

Precision Grinding Wheel Company (Foundry Wheels) 51

Production Machine Company (Grinding Machines) 71
Charles Palm & Company

Queen Stove Works, Almco Division (Barrel Finishing Equipment) 57
Alfred Colle

Rampe Manufacturing Company (Barrel Finishing Equipment) 78
Kenneth Kolpien Advertising Service

Rankin Brothers Engineering & Sales (Disc Grinders) 80
Mack-Wharton Advertising

Raybestos-Manhattan Inc. (Portable Abrasive Wheels) 5
Roland G. E. Ullman Organization

Royal Master Incorporated (Grinding Machines) 74
S. M. Ferrer Advertising

Sanford Manufacturing Corporation (Grinding Machines) 79
Spooner & Kriegel Advertising

Sheffield Corporation (Grinding Machines) 13
Witte & Burden Advertising

Simonds Abrasive Company (Grinding Wheels) 14, 15
Fox & MacKenzie Advertising

Smit, J. K. & Sons, Inc. (Diamond Wheels) 8
Reed, Decker & Stocki Inc.

Speed-D-Burr Corporation (Barrel Finishing Media) 48
Harry G. Willis & Associates

Stuart Oil Company, Ltd., D. A. (Grinding Lubricants) 6, 7
Howard H. Monk & Associates

Sunnen Products Company (Honing Machines) .....Third Cover
H. George Bloch Advertising Inc.

Texas Company (Industrial Lubricants) .....Second Cover
G. M. Basford Company

Thompson Grinder Company (Grinding Machines)....Fourth Cover
Emerson H. Mook Inc.

Torit Manufacturing Company (Dust Collectors) 65
Kerker Peterson Hixson Hayes, Inc.

U. S. Diamond Wheel Company (Diamond Wheels) 83

Van Norman Machine Company (Centerless Grinders) 10, 11
Sutherland-Abbott Advertising Agency

Victor Machinery Exchange Incorporated
Walter J. Zimmerman Assoc.
(Diamond Wheel Dressers) 66

Vincent Steel Process Company (Dresser Cutters) 52
Industrial Marketing Service

Vulcan Tool Company (Jig Grinders) 86
Chester C. Moreland Company

Walker, O. S. Company (Magnetic Chucks) 75
John W. Odlin Company, Inc.

Walls Sales Corporation (Belt Sanders) 67
Powerad Company Advertising

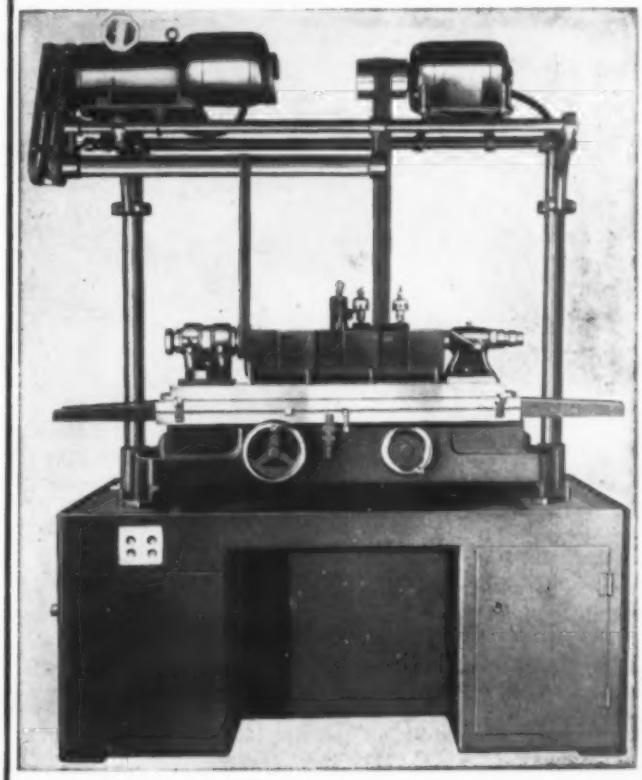
White & Bagley (Lubricants & Coolants) 66
Horton Noyes & Company

HOW CAN YOU LOSE WHEN YOU USE CRYSTAL LAKE GRINDERS

EASY OPERATION: CLOSE TOLERANCES: ACCURACY: FINE MICROINCH SURFACE FINISH

A CRYSTAL LAKE GRINDER will hold size as well as grind round from .000005 to .000020" and finish from One to Four Microinch SURFACE FINISH. The essentials in grinding are a round spindle, taper bearings, a spindle that can be adjusted periodically without the squashing of bronze boxes and to have belt pressure ninety degrees from grinding pressure so the bronze boxes will not wear out of round.

For example, fuel injectors, after having been rough ground, can be ground to .000010" roundness with a sixty grit wheel and one pass of the wheel.



A choice of General Electric Thymotrol, General Radio Variac, or Variable Speed Drive can be used without ripple or cine' wave being transmitted to work as all motors are mounted on self-contained countershaft.

Write for literature

CRYSTAL LAKE GRINDERS

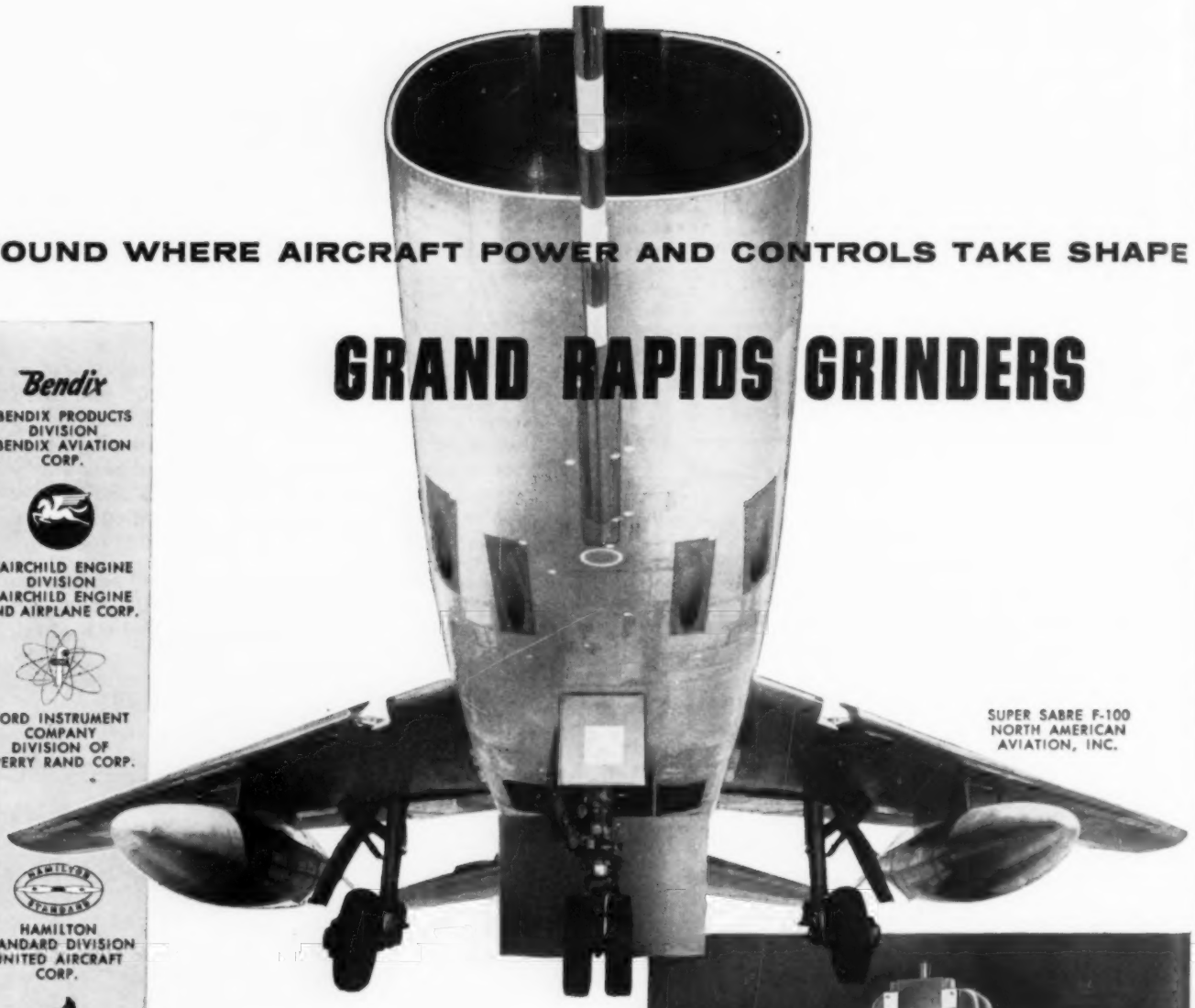
Since 1910

CRYSTAL LAKE, ILLINOIS

Use postpaid card. Circle No. 264

FOUND WHERE AIRCRAFT POWER AND CONTROLS TAKE SHAPE

GRAND RAPIDS GRINDERS



SUPER SABRE F-100
NORTH AMERICAN
AVIATION, INC.

Bendix
BENDIX PRODUCTS DIVISION
BENDIX AVIATION CORP.

FAIRCHILD ENGINE DIVISION
FAIRCHILD ENGINE AND AIRPLANE CORP.

FORD INSTRUMENT COMPANY
DIVISION OF SPERRY RAND CORP.

HAMILTON STANDARD DIVISION
UNITED AIRCRAFT CORP.

LEAR, INCORPORATED

ORENDA ENGINES LIMITED

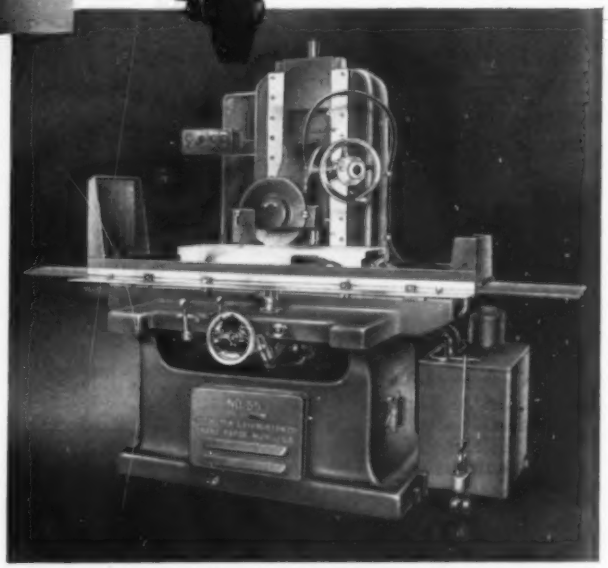
PRATT & WHITNEY AIRCRAFT
DIVISION OF UNITED AIRCRAFT CORP.

WRIGHT AERONAUTICAL DIVISION
CURTISS-WRIGHT CORP.

Precision is paramount in the manufacture of components for aircraft power and control. That's why these makers of precision parts have Grand Rapids Grinders in their toolrooms — for the utmost in precision grinding.

Model No. 55, for example, features one-piece column and base for permanent vibrationless rigidity. Longitudinal travel table and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. And it's faster than any other grinder of this type and size . . . with variable table speed up to 125 fpm.

With these built-in precision features typical of all Grand Rapids Grinders, it's no wonder they're found in leading toolrooms.



GRAND RAPIDS NO. 55 HYDRAULIC FEED SURFACE GRINDER. Table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head is 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1925 and 2500 rpm.

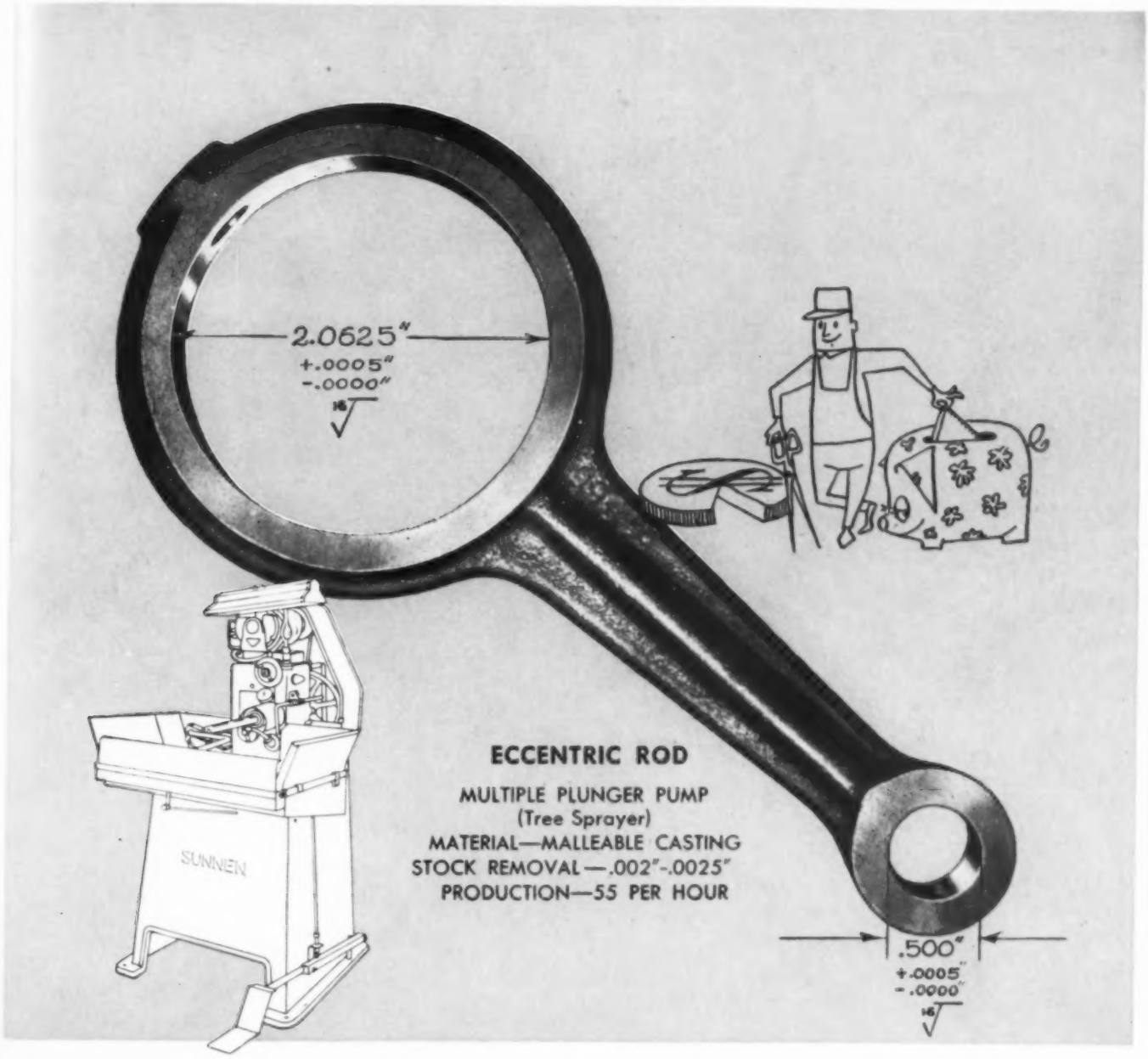
A note on your letterhead will bring full details.

GALLMEYER & LIVINGSTON

GALLMEYER & LIVINGSTON COMPANY

416 Straight Ave., S.W., Grand Rapids, Michigan

Use postpaid card. Circle No. 265



A COST-CUTTING PROCESS FOR ACCURATE BORE PRODUCTION

Tolerances are getting closer and closer! That's why producing bores to specifications (size and finish) with standard machine tools is becoming a tough job.

Many plants—large and small—have found the answer is Sunnen-Sizing. Holes are produced slightly undersize on the preceding operation . . . then, Sunnen Honing is used as the standard bore-finishing operation.

This process speeds production because you can open up tolerances on reaming, boring or grinding. You can increase speeds and feeds. Your tools last longer. Less time is lost sharpening, dressing and resetting tools.

Overall production is increased, all parts come within specifications . . . no undersize rejects—no oversize scrap.

GET ALL THE FACTS ON SUNNEN HONING

SUNNEN®
PRODUCTS COMPANY
HONING

7921-A Manchester Ave. • St. Louis 17, Mo.

SEND FOR FIVE INFORMATIVE BOOKLETS

CHECK READER SERVICE CARD

Circle No. 312 on postpaid card

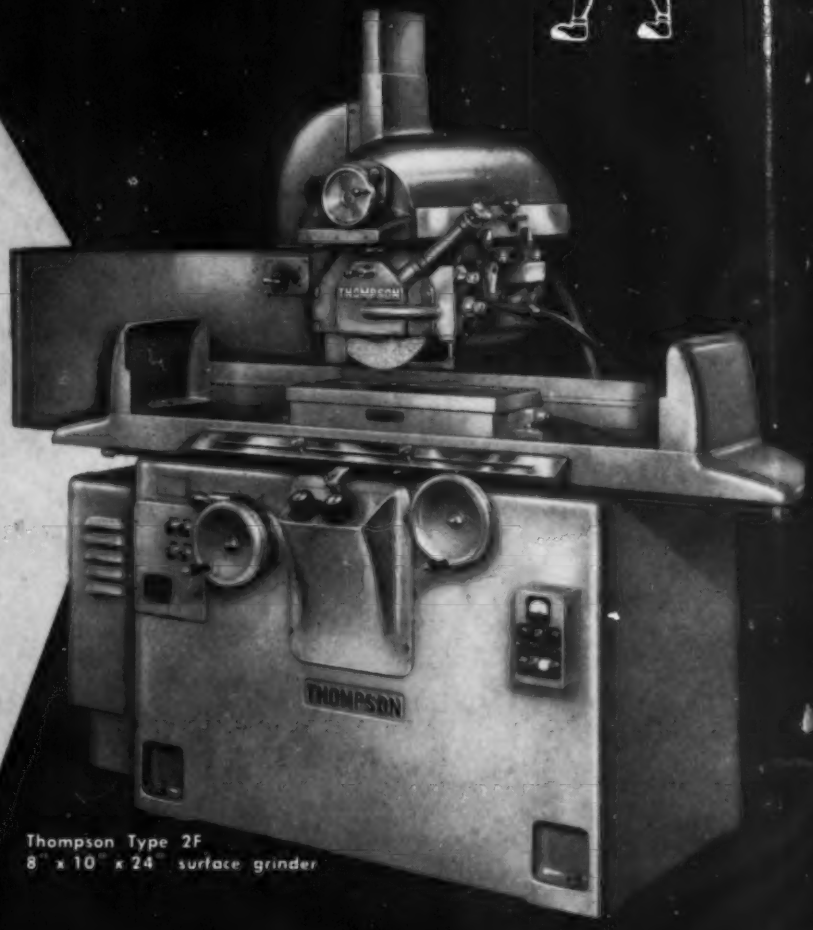
PRECISION PETE SAYS:

Only Thompson Type 2F Grinder has all three available . . .

1 COOLANT THRU THE WHEEL . . .

2 . . . COOLANT EXTERNALLY ON THE WORK . . .

3 . . . AND "IN POSITION" WHEEL TRUING



Thompson Type 2F
8" x 10" x 24" surface grinder

MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SURFACE GRINDERS

WRITE TODAY FOR DESCRIPTIVE DATA

THE THOMPSON GRINDER COMPANY
SPRINGFIELD, OHIO

Thompson SURFACE Grinders

Copyright 1956 The Thompson Grinder Company